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(NEW SERIES)

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ECONOMICS AND SINCERITY

By G. L. S. SHACKLE

WHAT does an economist mean when he says, regarding such-and-such a theory, 'I believe it' or 'I do not believe it'? Can he formulate a single, precise, and unambiguous test which will confer on any theory that passes it the right to be used without misgiving for all and every one of the professional duties laid on the economist? Ought he to impose on himself a code which, if there is some theory that he disbelieves, would forbid him to base policy recommendations on it, to teach it, or even to use it in his own thinking? What are the particular kinds of temptation to which the economist is exposed, and in what, precisely, does the successful rejection of these temptations consist, and what kinds of self-denial does it involve?

When all life's questions are answered for any one of us, life itself will surely have ceased to hold for him any interest or purpose. Are we then to say that so long as a man finds a theory interesting he does not yet believe in it? And if we constrict the notion of belief to this extreme degree, are we therefore to forbid him to act upon, teach, or think with any theory that he still finds interesting? An absurd and artificial dilemma, perhaps you will say. But if it be once admitted that a theory which we take invariably, absolutely, and unquestioningly for granted, and which we regard ourselves as having explored to the uttermost so that all its implications, and the consequences of acting on it, are known, could have no power of stimulating thought and indeed would be incapable of being any longer the object of thought, it follows of necessity that all the theories which have any active role in an economist's mental life and in his work must be ones that he can still cast doubt upon, can question and suspect, can feel to be incompletely worked out, and to hold unknown possibilities for good or evil when used as the basis of policy. To use only what we perfectly believe is therefore practically and essentially impossible. If to base advice upon, to teach, and to spend time in thinking about, things that we do not perfectly believe is morally wrong, the economist must shut up shop, must resign from his life-work and cease, as such, to exist. In what sense and in what degree, then, are we justified in using theories that we do not fully believe?

The very attempt to define an ideal and perfect degree of belief, in the sense of a willingness to commit ourselves wholly and unreservedly to some theory, to accept the consequences of applying it in any and every set of circumstances, shows that the concept is useless as a test of a theory's fitness to be used and taught. Perfect belief in this sense would require the perfect theory, able to interpret every situation, to predict the consequences of every course of action, to fit perfectly as a component mechanism into

the great engine of human knowledge and link up economics with psychology, technology, anthropology, history, politics, ethics, and philosophy without loose ends. To call such a conception a theory is almost a contradiction in terms. Let us then ask what are the essential and inevitable limitations of theories in general; what is their true nature and proper purpose; in what respects they can be superior or inferior; and whether there are any absolute tests, or any tests adapted to circumstances, which will tell us whether or when a given theory may be honourably invoked or must be repudiated.

In making a theory we begin by *selecting* some features from amongst all those that the world seems to present. Deliberate rejection and neglect of a part of reality is, then, part of the process of theory-making, and at the very start we have an immense disparity between the simple and poor pile of materials out of which the theory will be built, and the measureless wealth and complexity of detail afforded by whatever part of the field of phenomena we may have marked out for our operations. Now our chief guide in making this basic and all-important selection is tradition and historical accident, or, at best, the intuitive genius of one or two men living in a remote time when, superficially, human circumstances were vastly different. Why does the economist repudiate any suggestion that he should become an engineer, a chemist, or an expert in agriculture? Why does he say that technology is none of his business? Does not the wealth of nations intimately depend on these very kinds of knowledge, and the growth of that wealth upon advances in them? Who drew this frontier where it stands today? Economics is not a natural science, pure or applied, but a human science, you will say. Why then does the economist say that psychology is none of his business? Do we say that economics is concerned with men's preferences, choices, hopes, fears, beliefs, decisions, imaginings, motives, behaviour, and yet say that the inner truths about the working of their minds are none of our business? When a man chooses in the market-place, he is a fit object of study by the economist, but not when he chooses in the polling-booth. Ethics is not for the economist: economic man must play his queer game according to the rules, not presume to discuss them. The rules, indeed, are changed for him from time to time; sometimes he is rationed, sometimes not; sometimes he is exhorted to exercise patriotic restraint, at other times to exercise patriotic abandon; sometimes to save, sometimes to spend; it is very confusing for him when the rules are changed in the middle of the game, and all the good habits carefully conditioned into him from his youth turn out to be bad habits, and then perhaps good habits again, just when he has conquered them. But the economist must only allow himself a side-glance at the springs of that history-in-the-making which necessitates all this. Who drew *these* frontiers where they stand today?

But does it matter if the materials for the theory are chosen according to an ancient and an arbitrary canon? Indeed it does, for these materials have got to be built up into a machine that will work, a pattern that will make sense. We may remember the disaster that overtook the Sleeping Princess in the fairy-tale, simply because her parents had forgotten to invite to the christening party one of the most powerful fairies. If our selection of materials for a theory leaves out of account some powerful factor, all our plans based on that theory are liable at any moment to go astray. Sooner or later the princess will prick her finger; the trifling accident, unnoticed at the time of its occurrence, will set off a train of consequences which our inadequate theory has not warned us to be on the look-out for.

Let us sum up this first stage of our argument. Economics is a field of study enclosed within arbitrary boundaries. These boundaries are not part of the nature of things. No doubt after 175 years we can say that they correspond to a consensus of powerful minds. If the physiocrats failed to set economics off on a different path it was, perhaps, because its actual path was the true highway. Nevertheless these boundaries are artificial. Is there any natural discontinuity between a man's economic motives and conduct on the one hand, and, on the other, his conduct as politician, scientist, philosopher, poet, lover, or mystic? It is fair to ask, I think, whether the builders of economic theories are not in these days unduly conservative and somewhat tradition-bound in their choice of materials.

Having chosen his materials, the theorist proceeds to fashion from them a variety of structural members, a collection of ideas or concepts with which to build his theory. The economist has thus carved out such things as perfect competition, general equilibrium, the stationary state, marginal productivity, liquidity preference, the enterpriser or taker of decisions in face of uncertainty, and so forth. Each of these is designed to reflect some feature of what the economist observes, and does reflect it more or less faithfully. But now there is a second process of selection to be gone through. Like the misguided amateur of horology who has taken his watch to pieces, the economist finds that even in his restricted box of tricks there are far more pieces than he can contrive any use for in any one attempt at reconstruction. Some of the concepts are mutually incompatible and some are seeming duplicates with recondite but essential differences. Must we then admit that we can construct a number of entirely different models to explain one and the same world? Like a small boy who has thrown his cricket ball through a window, the economic theorist offers a variety of mutually contradictory explanations. I think it can justly be contended that modern economic theory does not show one picture but many highly contrasted ones, maintaining none the less that they are all likenesses of the same reality.

If, when he button-holed the Wedding Guest, the Ancient Mariner had propounded the question 'What is a theory?' perhaps his harassed victim might have answered, 'Well, it 's something that tells you what to expect in the circumstances; when things happen that weren't happening before, a theory makes you feel you are still in a familiar world; a theory tells you what to do to get desired results.' And I think this answer, considering the adverse conditions in which the *viva* was conducted, might at least have earned a pass mark. Seen in this light, a theory looks extremely practical. It is plainly the most essential of all tools for dealing successfully with one's environment in space and time. Yet in another light a theory has nothing to do with reality. It is an abstract deductive system, perfectly exemplified by a modern version of Euclid. Here we start with some words or other symbols which we do not define. We then make a number of statements about the ways in which these undefined things can be related to each other, taking care that these *postulates* are not mutually contradictory. Then we proceed to draw out the logical implications of this set of postulates, we work out, that is, what the postulates say *in effect*, beyond what they say patently and explicitly. Now suppose we can find amongst the phenomena we observe in the external world some that seem to be related to each other in the ways that the undefined entities are assumed in our abstract deductive system to be related to each other, and suppose we assume that this structure of relations between phenomena is invariant. Then we must conclude that all the theorems which are true of the undefined entities in our abstract system are also true of the observed phenomena of reality. What we have done is to assume a structural identity between the two patterns: the logical pattern of ideas in our abstract system, and the association, concurrent or in temporal sequence, of certain selected types of events in the external world. Now it is a common experience to find that amongst our friends Harry resembles John, and John resembles Alfred, but Alfred does not seem at all to resemble Harry. The reason is evidently that while, for example, Harry and John are alike in features and colouring, John and Alfred are alike in voice and manner. We cannot hope to find an abstract structure simple enough to give us a feeling of imaginative grasp and familiarity, and yet comprehensive and subtle enough to account for the limitless variety of detailed pattern in the unrolling tapestry of historical events. We have to choose between theories each of which accounts for some features and not others. To see what sort of consequences this has, let us consider some of the types into which economic theories fall.

There are many different cabinets each with its own set of pigeon-holes amongst which we can distribute economic theories. There is the cabinet which divides them into *general* theories and *particular* theories. But we must be careful. The word 'general' can here mean either of two quite

different things. It may mean that, within some context of thought (perhaps very limited), all possible types of situation have been provided for. This is what it means in the title 'The General Theory of Employment, Interest, and Money'. Or it can mean that the theory to which it is applied is one where everything in the whole economic world is explicitly admitted, and shown, to depend on everything else. This is how we are using the word when we say that Walras constructed a theory of 'general equilibrium'. It is in this second sense that 'general' theories stand over against 'particular' theories. Each kind has its own dangers. A particular theory builds an insulating wall round a small piece of the economic system and declares that nothing which happens inside that wall shall be deemed able to set up waves which can pass outwards through that wall and, being reflected or even amplified by contact with what lies outside, to come back through the wall and affect what is going on inside it. Thus, for example, we often regard the supply conditions and the demand-conditions for a particular commodity as independent of each other. We justify this in either of two ways. We may say: 'Only a very minute percentage of those who demand this commodity are also those whose services help to supply it, and whose incomes, in consequence, depend partly on how much of it is sold in unit time, and at what price.' Or we may say: 'Those who are demanding this commodity *today* will not, by offering higher prices and buying larger quantities of it, be able thus to affect their own incomes until *tomorrow*. Thus *today* demand and supply in this market are independent of each other.' Now the former argument is very well for such particular commodities as do not bulk large in any one person's budget. For them clearly the incomes of its suppliers will be in total only a small fraction of that total of incomes whose variations could shift the demand curve for the commodity. But it will never do to apply it to the market for labour, as those theorists used to do who thought that a fall in money wages would cause more people to be given employment. When we are tempted (often with ample justification) to use a *particular* theory, we ought to make sure that the insulating wall does not enclose so large an area that jangling and disturbing echoes will come back from what lies *within* the wall. General theories, on the other hand, may make the solution of special problems so difficult that thought is paralysed and we are prevented from reaching some valid conclusions. It has been said that the economist, by too drastic use of simplifying assumptions, 'may fail to see the wood because he has cut down most of the trees'. General theories, by contrast, tell us too little about too much.

Another cabinet devides economic theories into static and dynamic. A static theory describes a state of affairs which, once attained, nobody would have any incentive to alter. It is a conception which owes much more to physical analogies than to psychological insight. Nobody, so far as I know,

has yet written that chapter in the history of economic thought which would explain how *equilibrium* came to be a technical term of our subject and would trace the part this word has played and the meanings it has borne in our literature. But perhaps it is not too fanciful to suppose that the immense prestige and ascendancy in men's minds which mechanics, and in particular celestial mechanics, came to possess during the seventeenth, eighteenth, and nineteenth centuries must have suggested to economists the search for some simple and all-inclusive principle to explain the structure of their world. Impressed first of all by the physical constraints which nature and geography imposed on the satisfaction of men's abiding needs, they turned then to those needs themselves, and in the opposition between desire and scarcity they perceived the principle of *balance*, of the ultimate compromise which nobody could alter to his advantage. Implicit in the idea of equilibrium is that of stability, an inherent tendency of things to recover their 'balance of power' adjustment if any change in the governing conditions, the bounty or parsimony of nature and men's own desires and knowledge and institutional arrangements, disturbs it. Now to say that things have a tendency to *recover* an equilibrium is to say that they have a tendency to *seek* one: if the notion of stable equilibrium truly fits some aspect of reality, we have an explanation not only of rest but of movement. Economists have indeed sometimes come to believe that a tendency towards an equilibrium is part of the nature of every economic system, and that in seeking to explain movement, that is, why the system occupies a different situation at the end of each successive unit time-interval, we need only discover what shift in the governing conditions has made a movement necessary, and what it is that prevents the adaptation to this shift from being instantaneous. But once it is admitted that adaptation need not always be instantaneous, we have brought in the idea of time-lags between events and their consequences. And this idea is dynamite for the believers in a universal tendency to equilibrium.

Beginning, perhaps, with Wicksell and his rocking-horse analogy, some economists, most notably Professor Frisch, have sought inspiration in the behaviour of physical systems with quite different results from those of the equilibrium theorists. They have looked at mechanical and electrical systems whose natural and inherent response to an impulse is to *oscillate*. The time-lag is the key which unlocks this door and permits the economist to play with wave-motions of every kind. And what may well amaze him is the simplicity of the assumptions that suffice to provide us with damped, undamped, or anti-damped oscillations by a slight adjustment in the numerical value of one coefficient. Functional connexions of the simplest and most obvious kind are all we need assume, provided the connexion is between variables at different dates. But if small changes in the numerical

values of parameters can so radically affect the behaviour of the system, is it not of prime importance to find out what are the actual values of such parameters in existing economic system?

Economics in the older-fashioned sense finds itself nowadays rather in the position of a legitimate monarch of retiring disposition who finds his authority challenged by the dynamic personality and boundless ambitions of a young brother, newly grown up and of somewhat doubtful pedigree. Econometrics, if we date its birth from the founding of the Econometric Society in 1930, is now twenty-two years old, and claims the throne by its descent from economics, mathematics, and statistics. To an avowed legitimist this seems an inflated claim. As for the application of *mathematics* to economics, what of Cournot, Marshall, Wicksell, Edgworth, and Fisher, to say nothing of Walras and Pareto? As for *statistics*, what of Tooke, Newmarch, Stamp, and Sir Arthur Bowley? What, we might ask, is there new in econometrics except its name, which attains, as it were, the second degree of portmanteaux-ism by eliminating one of its essential *m*'s: surely it should be ECO/*NOMO*/METRICS, or better, perhaps, metro-economics? However, this insinuation is not fair. There *is* something new in econometrics; something that is not to be found in mathematical economics in the sense of Marshall's Appendixes, nor in economic statistics as understood by the great compilers of the past. Mathematical economics is the expression, in rather general analytical forms, of hypotheses concerning the essential structure of the economic organism and the drawing of inferences from it. We are content to write $y = f(x)$ without specifying the precise sequence of operations denoted by the symbol $f(\ )$. But the econometrician is *not* content with this. He wishes to write out in full an equation, not merely with all its parameters explicitly represented by letters, but with actual numerical values assigned to them. And how right he is to want this. Mr. Hicks has reminded us that if the numerical value of the coefficient which expresses the dependence of current net investment on a single earlier change of output is altered from a trifle less to a shade more than some critical value, the result will be altered from stability to explosion. In economics, quantitative as opposed to mere qualitative thinking is essential, and the econometrician is amply justified in seeking to test and to quantify the hypotheses of the qualitative economist (and this term includes the mathematical economist) by reference to recorded facts. Yet the econometrician has suffered painful shocks and disastrous disinflation of his claims. What did he tell us about unemployment in the post-war transition? Why does he speak pompously of 'incomplete information' when all he means is uncertainty, that familiar spirit who walks with us everywhere? Does the econometrician realize that his references to 'incomplete information' imply that there can come within human reach and ken something that could properly be called 'complete

information'? And does he realize that *omniscience* has not, traditionally, been claimed by mortal man, at any rate in his more sober moments of decent humility? Small wonder that this ὕβρις has sometimes fallen into the pit. For this phrase 'incomplete information' betrays a gross and cardinal error: the belief or supposition that, in real life, a man can ever know whether or not his information is complete. Does there not come to us, upon the echo of this phrase, a faint ripple of Homeric laughter rolling down from Mount Olympus?

The only problems where information can be known to be complete are those of the pure mathematician, the class of problems, that is to say, which we expressly define as being entirely unrelated to the world of external observation. The econometrician is an applied mathematician: for him there never will and never can be information known to be complete. The forms of the functions which he has fitted, with the great labour and an ingenuity which we must all admire, to data supplied by observation, to data, that is to say, about the *past*, cannot be guaranteed to hold in the future. Economics is not physics, it is *psychics*, the study of men with all their capacity for learning and experimenting and inventing and imagining. We are bound to applaud the econometrician for seeking to put numbers in place of letters in the formulae supplied to him by the theoretical economist, but we must warn ourselves that these numbers are not eternal truths.

We have glanced at the nature of theories and considered its bearing on the ethics of employing them. Let us turn for a moment to their genesis. I have nothing to say of the unaccountable spark which fires new thoughts in a man's mind and gives him moments of almost painful excitement. I wish only to consider what happens to a theory when it becomes the common property of the colleagues and pupils of its originator to the third and fourth generation.

What are the merits and the dangers of an oral tradition? It is, I suppose, a sign of greatness in a University faculty or department, or at least a source and sign of prestige and evidence of time-honoured respectability, to be able to claim an oral tradition. The two great examples that spring to mind are those of Cambridge and Vienna. How does an oral tradition come into being? Surely it must be founded by some thinker of superlative achievement who is also an able and assiduous teacher. He must also, no doubt, be fortunate in his pupils, some of whom, if the tradition is to gain influence and momentum, must approach him in intellectual stature. This will assure the doctrine of a sufficiently prolonged vitality and widespread renown for it to become established and respectable, a staple of textbook diet and a yoke under which all future students will have to pass. But more is needed. If the master had no pupils, the doctrine would become part of

the literature but would not hang in the sultry air of lecture rooms and impregnate the very furnishings of those where seminars are held. If he had only pupils of high originality the doctrine would be too rapidly transformed and developed to be properly called at any time a tradition. There must be a host of lesser men, able to receive and to impart the doctrine but not to improve it. These will give it stability of form, will make it gradually easier for pupils to understand, will rub off the rough edges of its original formulation, and polish it to become a presentable, civilized item of the teaching economist's stock-in-trade.

Which parts of this process are good and desirable, and which are bad? The bringing to bear on any doctrine of the searching light of able, leisured, well-informed common-room discussion, over many years and by a great number of perfectly disinterested men, must tend to discover weaknesses and elucidate assumptions, to ensure that the assumptions are mutually compatible, to elicit clear definitions and reveal ambiguities, to drive out infelicitous terminology, to refine, simplify, and clarify verbal expression. So much for what happens in the evening. *In vino veritas.* But what of the morning? Then the teachers must teach. They must present the doctrine as something worthy of being studied, grasped, learnt, and acted upon. They are no longer impartial critics but purveyors of a commodity. Moreover, they may feel themselves to be guardians of a tradition. They can permit themselves to offer pious emendations of classical texts, but not to embark on wholesale heresy. Thus the doctrine will tend to become fossilized. Some of its assumptions will cease to be *mere* assumptions in the modern, formal, non-committal sense and become Euclidean 'self-evident truths'. Finally it may be asked: 'why have an *oral* tradition?' Are men too lazy, or too much afraid of criticism, to put their thoughts on paper? Economists ought to be a guild of craftsmen, not a priesthood with mysteries.

I have one more topic to broach concerning the genesis of theories, and it is this: ought those of us who embrace economics as a life-work to feel entitled to specialize to no matter what extreme degree, to concentrate all our powers and affections upon one narrow tract or upon one single kind of work? Is it right that those whose inborn urge and aptitude is teaching (I mean teaching in the strict sense, the art and practice of imparting and eliciting ideas, of sowing thoughts and garnering enthusiasms, of implanting skills and shaping minds) should be encouraged to devote themselves wholly to this, or (to see the matter in a harsher light) should be so burdened with teaching duties that they have no time nor reserves of strength for anything else? Is it right that those whose bent is the gathering, sifting, and sorting of facts and their compilation in orderly array should never be compelled to lift their heads from their holerith cards and let their minds

run free upon the philosophy of what they are doing? Is it right that those whose strong magic is locked up in the hieroglyphs of confluence analysis and factor analysis should never be called upon to explain themselves to us others, so that in fact they would have to explain what they are doing to *themselves*? Ought theory to compartmentalize itself so that the grower of business-cycle roses never looks over the wall at the vegetable marrows of monetary theory with their vast inflations, or peers sourly at the grapes in that hot-house, the theory of value? I do not think these exclusivities (for this word I salute *The Times* fourth leader) can be good either morally or intellectually. Can it be good for our moral fibre to be always free to do just what we really enjoy doing? Ought not teachers sometimes to be given an enforced rest and made to research, and ought not researchers to have thrust upon them at intervals an unwanted holiday and be made to teach? But whether or not it is good for our characters and our self-respect to be faced sometimes with tasks that do not lie on our chosen track, with the unfamiliar and the formidable, I cannot doubt that it is good for the freshness and the richness of our minds. The professional expert tends to be a man who knows what cannot be done; the amateur, free from such inhibitions, sometimes just goes and does it.

May I turn now, for the last section of my paper, to the question of how theory should be expressed. One aspect of this is the choice between literary, diagrammatic, and algebraic or analytical modes of thinking and of communication, but a frontal attack on this theme would require a book rather than a paragraph. I can only strike it a glancing blow in pursuing a rather different quarry.

It is the ambition of some economists to establish their subject's claim to be a science. However that may be, the *exposition* of an economic theory is an art, and in art, according to some experts, we are faced with a conflict and a competition between the claims of content and of form. How real is this opposition? Are form and content like guns and butter at present, the one needed to preserve the other but none the less compelled to elbow it out? What is the scarce resource for which they compete? Is it the writer's nervous energy and powers of concentration, or is it, more fundamentally, something to do with the structure of a sentence or the design of a chapter, which structure cannot (so it might be asserted) accommodate at one and the same time the thought in its purest essence and the adornment needed to give it grace and power of fascination? Let us seek light on this from some analogies. An architect drew attention recently to a surprising contrast, which I will express in my own words in the form of a question: Which was the more beautiful, the Victorian age's imitation gothic buildings encrusted with ornaments and turrets, or its utilitarian suspension-bridges with their cobweb strength? The *content*, so to speak, of a steel

bridge is its strength. What gives it that strength is nothing other than its form. In pure mathematics is it not true that content and form are one?

Economics is essentially a mathematical subject, for it treats by logic of the relations between quantities. I am far from suggesting that its arguments can only be handled by means of a formal notation using the symbols of algebra or the calculus. Economic theory, mathematical by its very nature, can yet often be best expressed in words. But the verbal statements must then strive to compete, in exactness, lucidity, and economy, with the symbolic statements that could replace them. For the verbal statements too (can we not argue?) meaning and form are inseparable.

I have listed exactness, lucidity, and economy as the first essentials of expository prose. I do, indeed, think that these three qualities are the ones we ought most to strive for, seeking precision first of all since here in particular the oneness of form and content must reside. A thought can have no *public* existence save in virtue of the way it is expressed. Some of us may think primarily in mental images or form-phantasms, we may possess the power to make the arcs and ogives of our diagrams curl, shift and unbend, shrink and expand, in a verbal silence in the mind, arguing with ourselves purely by means of a visual imagination. But to convey these thoughts to others we must resort in part at least to words, and the shape of our sentences will be taken for the shape of our thoughts. To convey these thoughts at all, however, to get anything across, we must be lucid. People sometimes speak as though precision and clarity were one and the same. This is a mistake. The painful contortions of legal phraseology are necessary and justified because only thus can the framers of laws say exactly that which they mean. These strivings for exactness make the statute book unintelligible to any but a lawyer. Lawyers, however, are driven to these extremities because they are deprived of one powerful device which the theorist can call in aid: *abstraction*. The lawyer must expect to have his meanings 'twisted by knaves to make a trap for fools'. He cannot simplify and select the objects of his discourse by means of definitions. He cannot draw up the rules of his game before he consents to play it. For the theorist it is different. The things referred to in his theories are not men and women of flesh and blood, unsimplified, passionate, cunning, mercurial, devious, incalculable, but are mere chess pieces, their possible moves and powers exactly known. To be both clear and precise at the same time is possible for the theorist, and to fall short in this is to be second-rate. Thirdly, there is economy. The good sentence contains not a wasted word. By this I do not mean that a word should be left out if *nearly* the same meaning could be expressed without it. The subtlest nuances, the most impalpable distinctions, are within the theorist's rights, and he must not be accused of prolixity merely because he has elected to bind elusive thoughts with many

verbal strands. Nor need we think that economical prose is necessarily plodding and flat-footed. The athlete's leanness is one secret of his speed.

There is a well-known saying that 'knowledge is power'. It would be at least as true to say that 'language is power'. It is not only the professional spell-binders, the politicians and dictators, the leader-writers, the novelists, the poets, priests, and prophets, for whom a silver tongue is the indispensable vehicle of their magic. We also, humble economists, working, as some think, in the mere kitchen of the palace of culture, are entirely dependent on the power to compress our thoughts into the mould of words.

Have I given you the impression in all this that I think of the economist as a mere dabbler in ideas remote from the realities of life, a spinner of fine webs of thought that break at a touch, a player of meaningless games with symbols, a verbal juggler, and an oracle of more than Delphic ambivalence and obscurity? I did not mean to. The great economists have been moved as surely by a hunger for truth as any natural scientist. Pure curiosity, the desire to know for the sake of knowing, the sheer inner need to understand, is what has impelled them. Like the philosophers, they have been subject to their temptations. They have sometimes fallen in love like Pygmalion with the beauty of their own creations, and allowed elegance the ascendancy over realism. Sometimes they have succumbed to the lure of paradox and made things needlessly difficult in expression. Some economists, lesser than the greatest, have been dazzled by the flash and glitter of their own algebraic swords as they whirled them in the ritual dance of formal analysis. Yet on occasion these sharp tools alone could cleave the Gordian knot, and the list of the greatest economists includes a high proportion who have in some degree been also mathematicians: Cournot, Marshall, Wicksell, Pareto, Edgworth, Keynes, and Irving Fisher are enough to tell us this.

And finally, what of the economist's right or duty to offer counsel in the practical contingencies of the nation's life? Being sure that he does not know everything, being certain only that nothing is certain, ought he to be silent? The class of economists are like a ship's crew who have been wrecked in a swirling tide-race. Often a man will hear nothing but the roar of the waters in his ears, see nothing but the dim green light. But as he strikes out his head will come sometimes well above water, where for the moment he can see clear about him. At that moment he has the right to shout directions to his fellows, to point the way to safety, even though he may feel sure that next moment he will be again submerged and may then doubt whether after all he has his bearings.

UNIVERSITY OF LIVERPOOL.

THE ORIGIN OF THE STATE TELEPHONE SERVICE IN BRITAIN

By ARTHUR HAZLEWOOD

I

THE organization of an industry may be more or less closely in harmony with its technical and economic characteristics. Much of the recent discussion on nationalized industries has been concerned with the extent to which they are organized in ways appropriate to their technical and economic structures. Often it is suggested that, when government acquires an interest in an industry, it is likely to lead to a wide divergence between the most appropriate organization and that actually adopted. The influence of government, it is argued, is to encourage monopoly irrespective of the technical and economic justification for monopolistic organization. This contention invites inquiry into the history of nationalization.

In a recent book[1] Mr. R. H. Coase has discussed at length the history of broadcasting in this country. He has analysed the reasons why 'broadcasting in Great Britain came to be organised on a monopolistic basis' and 'the effect of the monopoly on the development of, and policy towards, competitive services such as wire broadcasting and foreign commercial broadcasting intended for listeners in Great Britain'.[2] An important part in the events he discusses was played by the British Post Office, which 'from the first exerted such influence as it possessed (and this was considerable) in order to bring about a monopolistic organisation' and 'in the case of the two most important threats to the monopoly of the Corporation . . . took such action as lay within its power to protect the monopoly'.[3] This was not the first time the Post Office had been involved in such matters. In fact, its interest in broadcasting was only part of an interest in electrical communications generally which it had acquired in an earlier period. The establishment of a broadcasting monopoly, and the rise of competitive services, is paralleled by the earlier establishment of a monopoly of public telegraph business,[4] with the subsequent development of a rival in the form of the telephone service. This article reviews the early history of the telephone service in Britain as shaped by the Post Office monopoly of the public telegraph service.

[1] R. H. Coase, *British Broadcasting, A Study in Monopoly*, 1950.
[2] *British Broadcasting*, p. ix.
[3] Op. cit., pp. 193–4.
[4] The inland telegraph service has been conducted by the Post Office since 1870. The government of the day decided to purchase the systems of the existing telegraph companies because of public dissatisfaction with the service provided by the companies.

II

The first telephone company in this country was established in 1878 under the name of The Telephone Company Ltd. using the patents of the inventor, Graham Bell. Telephone exchange service was opened in London and in a number of provincial towns in the following year. A rival, the Edison Telephone Company, using different patents, was set up during 1879, but the two companies amalgamated within a year to form the United Telephone Company. This amalgamation, no doubt stimulated by the prospect of a legal battle with the government, ended the first attempt at competitive telephony. From a technical point of view it was undoubtedly advantageous. The Edison Company had a good transmitter but an unsatisfactory receiver, while the Bell receiver was good, but that company had to use a similar instrument as transmitter, for which purpose it was inefficient. The United Company had the use of both Bell and Edison patents.

Acting on legal advice as to the extent of the Postmaster General's powers under the Telegraph Acts, towards the end of 1879 the government took action in the courts. Judgement was given for the Crown. The court found that a telephone is a 'telegraph', and a telephone conversation a 'telegram' within the meaning of the Telegraph Acts, and that the activities of the company infringed the monopoly of the Postmaster General.

Having confirmed its monopoly, the Post Office could itself have developed and operated the telephone service as a unified system over the whole country. However, the government did not follow this course but arranged to license telephone companies to carry on business. The United Telephone Company began to operate under a licence valid for 31 years from the end of 1880,[1] the Postmaster General reserving the right to purchase the company's exchange system at the end of 1890, 1897, and 1904. The licence provided for the payment of a royalty equal to 10 per cent. of gross revenue, restriction of the area within which the company might operate, and prohibition of the use of the telephone by non-subscribers.[2]

The Treasury consented to Post Office telephone activity 'on the understanding that its object is by the establishment of a telephonic system to a limited extent by the Post Office to enable your department to negotiate with the telephone companies in a satisfactory manner for licences'.[3] As a result there was only slight development of a Post Office telephone system at this time. In 1882 the Post Office had only 177 exchange telephones in

[1] The licence was due to terminate on 31 Dec. 1911.

[2] This last clause prevented the establishment of public call-offices.

[3] See *The Post Office, An Historical Summary*, 1911, p. 89, and the evidence of Mr. Lamb, Second Secretary to the Post Office, in charge of telegraphs, to the Select Committee on Telephones, 1898, question 1109.

service, whereas in London alone there were 1,338 company subscribers by the end of 1881.

Already established provincial systems were freely granted licences to continue business, on conditions similar to those of the United Company's London licence. But, in considering applications for licences from new undertakings, it appears that account was taken of the undesirability of rival exchanges operating within the same area.[1] This led to complaints of discriminatory treatment and that the policy was creating a private monopoly.[2] In 1882, however, a newly formed company, the London and Globe Telephone and Maintenance Company Ltd., applied for a licence to set up in rivalry with the United Telephone Company in London, and this was eventually granted. Further, it was decided on the ground that 'it would not be in the interest of the public to create a monopoly in relation to the supply of telephonic communication'[3] that the Postmaster General would grant licences to all applicants on certain conditions. But a warning was given that a licence gave no wayleave powers for the erection of poles and wires or for the construction of underground cable routes, for which the licensees would have to make their own arrangements, nor did it confer authority to use patented apparatus. The Postmaster General, the economist Henry Fawcett, declared that 'the Department were going to allow free competition—competition not only among the Telephone Companies themselves, but between the Companies and the Post Office', and for the information of telephone company 'investors who had speculated in them with the idea that some day they would get favourable terms from the Government', he pointed out that 'he did not think there was the smallest chance that the Government would ever have to purchase any Telephone Company's undertaking'.[4]

The new licences provided that the licensee should supply telephone instruments to the Post Office, which would facilitate the Post Office entering into competition with the companies. However, there was still no significant development of the Post Office system owing to Treasury policy. The Treasury expressed the opinion that 'the sound principle . . . is that the State, as regards all functions which are not by their nature exclusively its own, should at most be ready to supplement, not endeavour to supersede private enterprise . . .'.[5] By 1884 there were only 954 Post Office

[1] F. G. C. Baldwin, *The History of the Telephone in the United Kingdom*, 1925, states that, in Jan. 1882, in declining to grant a licence to one applicant, the Postmaster General 'expressed the view that it was generally recognised it was not in the public interest that several rival exchanges should be established in one town, an important condition of exchange systems being that every subscriber should be able to communicate with every other subscriber'. See pp. 562–3.

[2] See Dr. Cameron, *Parliamentary Debates, House of Commons*, 14 Mar. 1881.

[3] Postmaster General, ibid. 17 July 1882. [4] Ibid. 12 Aug. 1882.

[5] See Select Committee on Telephones, 1898, question 800.

exchange telephones in use. The prospect of private competition in London also came to naught. Legal action was taken to prevent the use of patented instruments by the London and Globe Company, on which the hopes of competition were based, and that company was absorbed by the United Telephone Company in 1884.

Subsidiary companies of the United Telephone Company were mainly responsible for telephone development in the provinces, though there were a number of independent companies operating in various localities. The country outside London came to be divided between six United Company subsidiaries[1] which, with their greater financial and technical resources, and aided by their ownership of the main patent rights, advanced against their various rivals until by the late 1880's most of the independents had been absorbed. The approach of the expiry dates of the main patents[2] led to a movement, in 1889, for a closer integration and strengthening of the associated companies to face possible competition. Difficulties arising from the administration of trunk traffic between operationally independent systems also prompted such a move. As the Postmaster General refused to license a new company formed by an amalgamation it was arranged for one of the associated companies, the National Telephone Company, to absorb the others. This process began in 1889 and was completed by 1894. The National Telephone Company, with more than 73,000 exchange lines and private wires, then controlled the entire telephone service of the country, with the exception of the 1,233 subscribers served by the Post Office. The Postmaster General in 1889, Mr. Raikes, 'felt very strongly against companies amalgamating, and was very anxious to keep up *bona fide* competition', but the Law Officers to the Crown advised that he had no power to prevent the amalgamations.[3]

Their original licences permitted the companies to construct telephone exchange systems only within local areas, and they could obtain interconnexion between towns only by renting lines from the Post Office under somewhat onerous conditions.[4] These conditions had prevented adequate development of a trunk-line network and this, in turn, tended to limit the growth of the local systems.[5] The restrictive effect of other clauses in the licences was also causing concern, but it was the clause requiring licensees

[1] National Telephone Co.; Lancashire and Cheshire Telephonic Exchange Co.; Northern District Telephone Co.; Telephone Company of Ireland; Western Counties and South Wales Telephone Co.; South of England Telephone Co.

[2] Dec. 1890 and July 1891.

[3] See the evidence of Sir Robert Hunter, Solicitor to the Post Office, to the Select Committee on Telephones, 1898, question 155.

[4] See complaint of Mr. Gray, *Parliamentary Debates, House of Commons*, 22 May 1884.

[5] See evidence of Mr. Forbes, Chairman of the National Telephone Company, to the Select Committee on the Telephone Service, 1895, question 4183. London had no telephone connexion with a provincial town until the end of 1884, when a circuit to Brighton was opened.

to supply telephones to the Post Office that was particularly attacked. As the agreements between the United Telephone Company and its subsidiaries, allowing them to use patented apparatus, forbade their supplying instruments to the Post Office, these companies could obtain licences only by accepting a condition it was impossible for them to fulfil. The Postmaster General admitted that this clause was responsible for the fact that only 8 out of a total of 77 applications for licences had been successful in the two years following the 1882 change of policy.[1] Consequent upon considerable agitation, and upon presentation by the companies of detailed proposals for modification of the licences, the Postmaster General agreed in 1884 to relax the licence conditions.[2] The requirement to supply telephones to the Post Office was dropped, and the area restrictions were removed so that the companies could construct a trunk-line network.

With the relaxation of the licence conditions, considerable efforts were made to extend the trunk system, and the Post Office became apprehensive of the effect on the telegraph revenue. At the same time there was much public agitation against the National Telephone Company, both on account of its alleged high charges and poor service and because of the growing mass of overhead wires which disfigured large cities. This latter fault was the consequence of wayleave difficulties which the National Company, despite repeated attempts, had failed to overcome, for it was largely the unwillingness of local authorities to grant wayleaves which prevented the company developing a planned underground distribution system. Wayleave difficulties were also hindering the further growth of the trunk network.

The government's telephone policy was once again modified in 1892 because of 'public dissatisfaction with the service which the companies were rendering, and the alarm of the public at the uncontrolled monopoly which was gradually being created.[3] The Government were also influenced by the repeated demands of the companies for further powers to enable them to meet the public's requirements; and again the Government were concerned at the effect which the competition of the telephone companies was having on the telegraph revenue.'[4] The new policy was set out in a

[1] *Parliamentary Debates, House of Commons*, 22 May 1884.

[2] Fawcett, ibid. 7 Aug. 1884.

[3] The pages of *The Economist* bear witness to contemporary views of the monopolistic behaviour of the National Telephone Company. For example, it writes of 'profits swollen by abuse by the company of its monopoly' (11 Mar. 1899) and declares that the company 'has been in a position to bring its system a little nearer perfection, but it has preferred to pay big dividends' (7 Aug. 1892).

[4] Evidence of Mr. Lamb to the Select Committee on the Telephone Service, 1895. The telegraph service showed a surplus of revenue over expenditure of £88,000 in 1889. This decreased to £85,000 in 1890 and to £68,000 in 1891. In 1892 the surplus changed to a deficit of £90,000. Lamb claimed that the change was 'very largely due to the telephones'. See questions 64–69.

Treasury Minute[1] and expounded in the House of Commons. The Post Office was to acquire and operate the trunk lines, company activities being in future restricted to specific exchange areas. No further licences for the whole country were to be issued; a licence would be granted only if the local authority in the area concerned thought it desirable; and, in order to prevent the formation of companies whose sole object was to force the existing licensee to buy them up, a company would be licensed only if it gave evidence of having sufficient capital to carry out its plans. The Postmaster General was to extend certain of his wayleave powers to the companies, but they were still to be largely subject to the veto of the local authorities in constructing their external line plant.

The Treasury Minute proclaimed the object of the new policy to be, 'while preserving property in the telegraphs, which has been paid for by the nation, to secure that expansion of the telephone system which is called for by public opinion and the necessities of commerce', and it went on to argue that 'unless the trunk wires are in the hands of the State, a monopoly injurious to public interest would inevitably ensue to the advantage of the company which first laid down such trunk wires'. Sir James Fergusson, the Postmaster General, frankly stated: 'the main reason why the Government desire to get the trunk lines into their hands is to see that whatever revenue arises from the telephone a portion shall go to the public'; but he also claimed that the policy was designed to assist telephone development by use of the Postmaster General's wayleave powers. And, in reply to the criticism that the new policy would reinforce private monopoly, he argued that 'it is because these companies have amalgamated and because they make no competition worthy of the name, that the establishment of a different system has become necessary, and the Government have intervened to secure the development of the system of exchanges and their connection with the trunk lines'. He had 'not the least doubt that in a very short time we shall hear of the establishment of new companies and new exchanges', and he knew of 'two or three which are only waiting for the settlement of this policy to start'; government control of the trunk lines was 'the very way to encourage competition'.[2] Despite these statements there is reason to think that it was the threat of competition, rather than active competition itself, that the government now had in mind. At the time the Chancellor of the Exchequer, Mr. Goschen, stated: 'when we are assured that a town is badly served competition should be introduced by another company, but where a town is sufficiently served there should not be all the inconvenience of multiplying wires, taking up the streets, and useless

[1] Treasury Minute of 23 May 1892 on *Proposals for Development of the Telephone System of the United Kingdom.*

[2] *Parliamentary Debates, House of Commons*, 29 Mar. 1892.

machinery which is inevitably attendant on the establishment of competing companies'.[1] And later he explained that 'the policy at that time was this, that competition was something to be kept *in terrorem* over the company, rather than that competition was to be established . . . I do not think that it was in the mind of the Government of that day, while we reserved competition . . . that we intended at once, and on any scale to establish competition ourselves or to grant licences for that competition'.[2]

Meanwhile the National Telephone Company was taking steps to ensure that competition did not become active. The direct threat came from the moribund New Telephone Company which had been revived in 1891 with the intention of competing with the National Company in London. By the time Heads of Arrangement for the new policy were initialed by the companies and the Post Office in August 1892, an agreement between the two companies had removed all possibility of competition.

When it became clear that nothing was to be expected from the New Telephone Company the government's policy was attacked for creating 'a new and unrestricted monopoly'. It was argued that the 1892 'agreement was made with two separate telephone companies, the object being to prevent a monopoly and to create competition. Since then, however, one of the companies had absorbed the other, and, therefore, the fundamental basis of the agreement no longer existed.'[3] Nevertheless, after long-drawn-out negotiations between the Post Office and the company over the details of the scheme, final agreement was reached in 1896, and the transfer of the trunk lines to the Post Office was completed by February 1897.[4] The National Telephone Company was then left to operate in the 213 exchange areas, together with London, which were specified in the agreement.

Wayleave difficulties persisted, for the company was still dependent on the goodwill of the local authorities, and they were soon to become worse. It appeared that the company had no legal redress against electrical interference caused by tramways, unless it took adequate precautions such as the provision of two-wire telephone circuits in place of the then common single-wire, earth-return system. This fact made necessary a large programme of line work by the company and accentuated the wayleave difficulties under which it laboured.

III

By this time municipal operation and ownership of local telephone systems had become an important issue. The years from 1870 were ones of

[1] Ibid. [2] Evidence to Select Committee on Telephones, 1898, question 8569.
[3] *Parliamentary Debates, House of Commons*, 1 Mar. 1895.
[4] The Post Office took over trunk circuits equivalent to 29,000 miles of single wire. It had undertaken development of the network prior to the transfer and by 1898 had an equivalent of 56,000 miles of single wire in service. The 1898 Select Committee found the British trunk telephone system to be 'the most extensive in Europe'.

increasing municipal participation in public utility operation. Tramway, water, gas, and electricity services were being undertaken by local authorities, and it is perhaps not surprising that some municipalities should have looked upon local telephone service as a fresh field for activity. The advocacy of municipal telephony became important after it was seen that no private enterprise competition with the National Company could be expected to result from the policy instituted in 1892. The desirability of licensing local authorities to set up telephone systems and to compete with the company had been considered by a Select Committee on the Telephone Service in 1895, but no recommendations had been reported. Glasgow Corporation was a leading protagonist of municipal telephony as a cure for its telephone troubles, and had applied for a licence as early as 1893. A Treasury inquiry into the state of the telephone service in that city laid the blame for the situation on the corporation's refusal to grant wayleaves for underground construction; it reported against municipal telephone service in principle, but suggested it might be desirable in Glasgow, given the determination of the corporation not to co-operate with the National Telephone Company. However, the Postmaster General declined to license the corporation.

In 1898 a further Select Committee[1] was appointed to consider the state of the telephone service. Much of its time was spent in determining whether active competition was excluded by either the letter or the spirit of the 1892 agreement, and it seems to have given far less attention to the question whether competition is a desirable form of economic organization in the supply of telephone service.[2] The committee decided not only that the right to compete was fully preserved, but also, in the face of much evidence presented both to it and to the Select Committee of 1895, that 'general, immediate, and effective competition, by either the Post Office or the local authority' was necessary, and should be 'real and active'. Competition was thought to be 'both expedient and necessary, in order, firstly, to extend and popularise the service, and next to avoid a danger which is by no means remote, if no alternative system is in operation, that a purchase of the company's undertaking at an inflated price may be forced

[1] Select Committee on Telephones, 1898.

[2] One exchange of opinion between Mr. Lamb and a member of the committee is, perhaps, worth quoting. Having been asked (question 1182) what disadvantage there would be in establishing rival municipal exchanges, Lamb replied: 'The confusion between one exchange and another; the subscribers to the municipal exchange would have also to subscribe to the National Company's exchange if they wanted a complete service.' The discussion continued: (Question 1183) 'Would not that be a matter for the subscribers. If they like to have two telephones in their warehouse, that is no business of ours, is it, and no business of the company's?—I think it is. (Question 1184) If they liked to pay for them they could have them, could not they?—Yes, they might; but I do not agree that it is not our business. (Question 1185) You think it is our business, and that our paternal Government ought to say to every man: you have no right to have two instruments, but only one; we want to protect your pocket?—I know from past experience that the paternal Government has been blamed very much by the public for allowing the two systems. . . .'

upon the Government', for the committee believed that public discontent with the company might compel the government to undertake the service itself. After considering the Select Committee's report, the government decided that the Postmaster General should grant licences to municipalities which applied for them, and that the Post Office should institute competition with the National Telephone Company in London.[1] The Telegraph Act of 1899 authorized local authorities to use rate funds and their borrowing powers to provide telephone service.

Immediately upon the inauguration of the new policy the Post Office began to prepare for the establishment of a service in London and in some provincial areas which had been neglected by the company. In starting a metropolitan service the Post Office possessed the great advantage that it had wayleave powers for constructing underground plant which the London County Council had denied to the National Telephone Company, thus seriously hampering the development of their service by forcing them to rely on a system of overhead distribution. On the other hand, the Post Office was starting from scratch, while the company had already almost 40,000 subscribers, so that, in the absence of intercommunication with company subscribers, the Post Office would be able for some time to offer only a very limited service. The dilemma was resolved in 1901 by an agreement between the Post Office and the company. The Post Office agreed to construct underground plant for the company in London, while the company agreed to give free interconnexion between Post Office subscribers and its own. This agreement, beneficial as it was to the telephone development of London, involved abandoning the aim of establishing competition —for which purpose the Post Office London system had been instituted— and established co-operation between the two systems. Except for the central area, where both undertakings were to operate, London was divided up between the company and the Post Office. Identical charges were to be made by the two administrations, and the company agreed in its future installations to conform to Post Office equipment specifications. Finally, it was agreed that the Post Office should purchase the company's London system, when its licence expired, on 'tramway terms'.[2] The Post Office proceeded with the construction of its London system, service being opened from its first exchange at the beginning of March 1902.

Municipal telephony in this country provides an illustration of genuine competition in the supply of telephone service. It is, however, as a warning

[1] See Treasury Minute of 8 May 1899 upon *Proposals for Development of the Telephone System in the United Kingdom.*

[2] These are based on plant cost. The Tramways Act, 1870, gave local authorities certain powers to purchase tramway undertakings at the current value of total physical assets, exclusive of any allowance for future profits or for compulsory sale. Cf. Sleeman, 'The British Tramway Industry', *The Manchester School*, 1939, pp. 159–60.

rather than as an example that it should be viewed. Unlike the situation in London, the towns in which municipal exchanges were set up in rivalry with the existing National Telephone Company system experienced duplicate systems without intercommunication and without agreed engineering methods.[1] Out of sixty authorities which asked for information, thirteen applied for licences, and only six actually established service.[2] Of these, four closed down after operating for a very few years, while only one survives to the present time.[3] A number of factors contributed to the failure of these experiments.[4] An insufficient number of local authorities were attracted by the scheme for really widespread competition with the National Telephone Company to take place. In the absence of this it was easy for the company to discriminate its charges in favour of those few places where it experienced competition, and it was politically difficult for municipalities to counter this discrimination by exercising their powers to use rate funds to subsidize their telephone services. The cheapness of municipal service was the great argument of its advocates, and in most cases grossly erroneous estimates of cost led to the establishment of unremunerative tariffs, with consequent financial difficulties. As inadequate depreciation charges were being made, these difficulties would have become more apparent if the life of the enterprises had been longer. And, certainly in Glasgow, the undertaking was unsound from an engineering point of view, an obsolete and inefficient system being adopted.[5] Despite their low and unremunerative charges the municipal systems failed to encroach upon the National Telephone Company's business. The municipal exchanges eventually passed into the hands of either the Post Office or the National Company. The fact that much of the plant was then generally abandoned is indicative of the wastes involved in the competitive experiment.[6]

Negotiations between the Post Office and the National Telephone Company with a view to the Post Office exercising its option to purchase the company's system at the end of 1904 did not result in agreement. But agreement was finally reached in 1905 for the company's system to be

[1] This was not the case in Hull, where agreement giving local intercommunication was reached. See evidence to the Select Committee on the Telephone Agreement, 1905, question 1638.

[2] The six were Glasgow (1901–6); Tunbridge Wells (1901–2); Brighton (1903–6); Swansea (1903–7); Portsmouth (1903–13); Hull (1904 to date).

[3] In 1911 Hull municipality took over the National Telephone Company's system and has operated the local telephone service ever since.

[4] See A. N. Holcombe, 'Municipal Ownership of Telephones in Great Britain', and V. M. Berthold, 'The Chief Cause of the Failure of Municipal Telephony in Great Britain', *Quarterly Journal of Economics*, Aug. 1907 and Feb. 1908, respectively.

[5] See F. G. C. Baldwin, op. cit., pp. 359–66.

[6] Although the service in Portsmouth continued in operation for considerably longer than most municipal services it well illustrates an important lesson of municipal telephony. A few years after it was taken over by the Post Office in 1913, all the municipal exchanges were closed, their subscribers being transferred to existing Post Office exchanges.

transferred to the Post Office, when the licence terminated at the end of 1911, on terms similar to those of the earlier agreement on the purchase of the London system.[1] It was becoming increasingly clear that the ultimate fate of the British telephone system was operation as a State service. The course of action rejected in 1880 would have to be adopted in the end. There was no possibility of the company's licence being extended beyond 1911,[2] and the experience of municipal telephony had shown that little was to be expected in that direction. The London agreement had foreshadowed the solution finally adopted for the whole country.

Despite arrangements between the Post Office and the National Telephone Company for proper maintenance and extension of the system during the period between 1905 and 1911, it afterwards appeared that development work was seriously neglected by the company towards the end of its active life.[3] The service was extended by absorbing spare capacity in the plant, a fair margin of which is necessary for smooth growth. As a result, when the Post Office took over, further expansion of the system was severely limited by the need for a large construction programme to be carried out, and the 1914 war intervened before the programme could be completed. An inventory of the company's plant was made and proceedings, which were not concluded until 1913, were begun before the Railway and Canal Commission to determine the purchase price. At midnight on 31 December 1911 the systems of the National Telephone Company passed to the control of the Post Office. The company at that time had 561,000 telephones in service, while the Post Office had something like 120,000, of which nearly 80,000 were in London.

IV

During the period we have surveyed the government pursued two main aims with regard to the telephone: firstly, to protect the revenue from the effect of telephone competition with the telegraph; secondly, to encourage the development of a satisfactory telephone service. Concern for the revenue was a continual motivation of policy, as is shown by the royalty charge and by the purchase of the trunk network, which diverted part of the telephone receipts to the Exchequer. There is no reason to doubt the

[1] See Memorandum and Draft Agreement of Feb. 1905, and *Report from the Select Committee on the Telephone Agreement*, 1905.

[2] The *Report from the Select Committee on Telephones*, 1898, had declared: '. . . it seems generally admitted to be desirable in the public interest that all licences should terminate in 1911.'

[3] The recommendations of the 1898 Select Committee were certainly influenced by the statement of the National Telephone Company representative that the company would probably not seek to extend its system after 1904 in view of the approaching end of its licence. As it turned out, there were about 10,000 people waiting to subscribe to the company's service in 1904. See *The Economist*, 26 Mar. 1904. For a description of the situation at the time of the transfer of the company's system see *Report of the Postmaster General* for the year 1911/12.

sincerity (so long as the revenue did not suffer) of official claims that the government desired to see an extensive and efficient telephone service developed. The difficulty was to achieve it. Here it is necessary to turn to the influences shaping policy. In the first place there was the feeling against the extension of State economic activities which, at the beginning, determined that telephone service should be undertaken by licensed companies, with the Post Office taking no significant part. Secondly, there was the hostility to the private monopoly which grew up, and the view that competition was necessary to control it. Thirdly, there was a recognition of the inconveniences and disadvantages inevitable with competitive telephony.

The desire for competition as a means of improving the telephone service, by preventing high charges, preferences between individuals, and other undesirable characteristics expected to be the consequence of private monopoly, was the paramount influence on policy in the earlier years. Although 'he was warned that there would be amalgamation, and that he could not prevent it', Fawcett adhered to a policy of 'unlimited competition', which also had the support of Mr. Raikes, who was Postmaster General from 1886 to 1891.[1] Later, as events connected with the transfer of the trunk lines show, competition came to be looked upon with less favour in official circles. Mr. Morley, who became Postmaster General in 1892, in succession to Sir James Fergusson, told the 1898 Select Committee that, as he was 'very strongly opposed to competition', he could not 'attempt to increase competition which existed in a limited number of cases'. This, he thought, was 'the policy, not only of the experienced officials of the Post Office, but almost anyone who has had experience in telephone matters'.[2] Nevertheless, ideas on the necessity of competition continued to have influence and were given powerful expression in the report of the 1898 Select Committee, as a result of which the policy of 'free trade in telephones', instituted in 1882, was given its final fling. The failure of the municipal experiment discredited the policy of competition and paved the way to unification of the service in the hands of the Post Office. But, even before this, force of circumstances had led to co-operation instead of competition in London.

Mr. Coase concludes his book with the suggestion that the widespread public support for the broadcasting monopoly 'reflects the spirit of the age' in which 'a monopoly held by a public authority, as in the case of British broadcasting, is considered to be free from the vices of private monopoly and to possess virtues of its own'.[3] In the earlier period, with which we

[1] See evidence of Mr. Lamb to the Select Committee on Telephones, 1898, questions 1132–8; also evidence of Sir Robert Hunter, question 155, and Sir James Fergusson, question 2190.

[2] Questions 6716 and 6729.

[3] *British Broadcasting*, pp. 195–6.

have been concerned, the influence of a different climate of opinion can be traced. Prevailing general ideas on the undesirability of the extension of government business enterprise, and on the virtues of competition, seem to have been more influential in determining telephone policy than were the facts of the particular economic and technical characteristics of telephone service. If these had been given full weight, it would have been apparent that an efficient service could not be achieved through competition. No doubt the unhappy experience of the policy of competitive telephony contributed to the formation of that 'Post Office tradition . . . in which the disadvantages of competition and the advantages of monopolistic operation were stressed or assumed'.[1]

OXFORD.

[1] R. H. Coase, op. cit., p. 193.

THE CLASSICAL ECONOMISTS AND THE IRISH PROBLEM[1]

By R. D. COLLISON BLACK

Of recent years the problem of 'under-developed areas' has come to the fore in economic discussion, and the impression created is that the subject received comparatively little attention from economists even in the inter-war years, and certainly none from their earlier predecessors. Yet in itself the problem is clearly not a new one, and it appears worth while to consider whether, and if so how, it was treated by the classical economists.[2] Such an inquiry may prove to be of more than merely historical interest in affording parallels with present-day conditions.

It is generally assumed that the classical economists confined their attention to the England of their day, and thus derived even their most general postulates from observation of an economy which, if not 'developed' in the modern sense, was certainly a rapidly developing one. Examples of under-developed economies were, however, constantly being brought to their attention; India provides a case in point, but the 'backward area' whose condition most frequently forced itself upon the notice of the English public, and whose problems most urgently demanded solution in the nineteenth century, was Ireland.

Thus an examination of the attitude of the classical economists to 'the Irish problem' may prove to be of much wider significance than at first appears. Such an examination divides itself into a study of two questions: firstly, How did the classical economists apply their analysis to the case of Ireland, and how far did that analysis influence public policy on Irish affairs? Secondly, How far did examination of Irish conditions in turn influence the thinking of the economists, or cause them to modify their theories?

If attention be confined to the major figures of the English classical school, it might appear that these questions are so easily answered as to be scarcely worth asking, for the specific references to Ireland in the writings

[1] This paper forms part of a series on the relationship between economic theory and economic policy, considered historically. Earlier results have been published in an article entitled 'Theory and Policy in Anglo-Irish Trade Relations, 1775–1800', *Journal of the Statistical and Social Inquiry Society of Ireland*, vol. xviii, pp. 312–26. The material for the present study was collected while the author was working in the United States on a research fellowship granted by the Rockefeller Foundation.

[2] The term 'classical economist' is used here to cover all those writers who, acknowledging Adam Smith as their master, expounded what was then called 'orthodox political economy' in the first 70 years of the nineteenth century. This usage will here be considered to apply not only to English writers but to their Irish followers also.

of such men are few.[1] This by no means exhausts the problem, however; not only must consideration be given to the work of minor figures, influential in their day, but also, in so far as classical economics sought to provide an analytical apparatus sufficiently general to be adapted to the problems of any economy, the influence of its exponents is not to be measured in terms of their direct statements on Irish affairs. In fact, the questions posed above involve consideration of the extent to which contemporary economic doctrines genuinely entered into the thought, and influenced the action, of politicians and public men of the day; this then requires examination not merely of the works of the economists, but of the speeches, letters, and other writings of the policy-makers, critically valued against the background of events. The magnitude of such an undertaking will be evident, and it should be emphasized that this paper constitutes only a summary introduction to the problem.

Beginning from the standpoint of the influence of theory on policy, the parts of the classical body of theory which were, or were thought to be, relevant to the Irish problem must first be considered. In the main these were: the Malthusian doctrine of population, the Laws of Returns, and, in connexion with these, certain aspects of Distribution theory, primarily the Theory of Rent and the Wages-Fund analysis.[2] Quite as important as the doctrines themselves are the assumptions, explicit or implicit, under which they were developed, and it is clearly essential to examine the question of how far those assumptions accorded with actual conditions in Ireland, and whether contemporary writers recognized them as so doing, or not so doing. This, however, can only be seen by considering the manner in which the economists used the tools at their disposal.

The classical theory of distribution provided one fundamental analytical tool which was constantly employed by the economists and their followers to elucidate the situation in Ireland. This was the population-and-capital concept, traceable to Adam Smith[3] and basic to the classical analysis of wages and profits. Smith stated that: 'The demand for those who live by wages, it is evident, cannot increase but in proportion to the increase of funds which are destined for the payment of wages.'[4] Applied to the case of Ireland, this mode of reasoning led to a clear and simple conclusion: in Ireland the increase of population had far out-distanced the growth of

[1] The only major economists of the classical era who devoted much attention to Ireland in their principal works were N. W. Senior and J. S. Mill, although there are numerous allusions to Irish conditions in the writings of J. R. McCulloch and T. R. Malthus.

[2] The classical theory of International Trade would appear to be relevant also, but in point of fact trade questions do not figure to any great extent in the discussions on Ireland in this period; they are therefore excluded from this article, which is intended only to outline the main trends of thought.

[3] See Smith, *Wealth of Nations*, bk. i, ch. viii, *passim*.

[4] Ibid., Cannan's edition, vol. i, p. 71.

capital, so causing the average rate of wages to fall to the barest minimum of subsistence and, in the absence of employment outlets other than agriculture, creating intense competition for land, with resultant subdivision of holdings and rack-renting. These ideas were sometimes stated in the stict form of the ratio between wage-labour and wages-fund, sometimes more loosely in terms of the ratio between 'population and resources', but in one form or another they recur constantly in nineteenth-century discussion, at all levels, of the Irish economy.

Thus McCulloch stated bluntly that 'the unexampled misery of the Irish people is directly owing to the excessive augmentation of their numbers; and nothing can be more perfectly futile than to expect any real or lasting amendment in their situation, until an effective check has been given to the progress of population'.[1] Francis Place likewise, in his discussion of population, found Ireland a suitable illustration for this doctrine:

> 'If population increase without a proportionate increase of capital, which we have seen it may do, the real wages of labour will fall. In course of time, the people will be reduced to extreme poverty and misery, and a stop will, by this means, be put to any further increase; in this state a bad harvest or two will cause dearth or famine, and produce pestilential diseases. Ireland, unhappily, furnishes a melancholy proof of a people in the latter state . . . there the immediate consequences of the causes mentioned may be seen in the misery of the people and the diseased state of the country, particularly in those parts where the increase of people had exceeded the accumulation of capital with the greatest rapidity.'[2]

There is ample evidence that this doctrine found acceptance outside the ranks of professional economists, in circles influential in the framing of policy. It recurs frequently in the reports of the numerous Select Committees and Royal Commissions appointed to investigate the state of Ireland in the first half of the nineteenth century. Thus the Select Committee on the State of the Poor in Ireland (1830) employed the concept in the first pages of their First Report:

> 'The population and the wealth of a country may both increase, and increase rapidly; but if the former proceeds in a greater ratio than the latter, an increase of distress among the poor may be concurrent with an augmentation of national wealth. The state of the labouring classes must depend on the proportion existing between the number of the people and the capital which can be profitably employed in labour.'[3]

Again in 1837 George Nicholls, who in other respects presented a Report on Poor Laws for Ireland very different from that of the Select Committee, agreed with them in regard to the relevance of this notion to Irish conditions:

[1] McCulloch, *Essay on the Rate of Wages* (Edinburgh, 1826), p. 133.
[2] Place, *Illustrations and Proofs of the Principle of Population* (London, 1822), p. 261.
[3] First Report from Select Committee on the State of the Poor in Ireland, *Parliamentary Papers*, 1830, vol. vii, p. 6.

'The capital of the country has increased, but the increase of population has been still greater; and it therefore does not follow that there is an increase of capital or comfort in the possession of each individual, or even of the majority. The reverse is unhappily the fact.'[1]

From such an analysis it was a short and obvious step to policy recommendations. The prerequisite for any improvement in the condition of the people was an alteration in the ratio of population to capital—either the population must be reduced, or the capital must be increased. At least in the early part of the nineteenth century, most of the authors who considered the problem seem to have been convinced that an alteration of the population–capital (or population–resources) ratio would provide a solution, without any major modification in the institutions of the economy. Perhaps nowhere can this view be found more plainly, indeed baldly, stated than in John Wheatley's *Letter to the Duke of Devonshire on the State of Ireland*.[2] In this Wheatley performs the simple arithmetical deduction that because Ireland has 7 million agricultural labourers and 21 million acres of land, giving 3 acres per person, while England has 4 million agricultural labourers and 33 million acres, giving more than 8 acres per person, then 'To make the agricultural population of Ireland better off than that of England, it is necessary that there should be more acres to each individual, than is the case in England, in order that the produce which is to be divided among them may be so much more.'[3]

Wheatley's reasoning was cast in terms of the population–resources ratio, interpreting resources in the sense of land. Naturally, therefore, his proposals for improvement ran along the lines of reduction of population, since he identified 'resources' with a fixed factor. Few others saw the problem in such sharp black-and-white terms as did Wheatley, but even though the majority cast their argument in terms of a variable capital stock, they were rarely optimistic as to the possibilities of its increase, at least in the short run.

'Lack of capital' was frequently cited as a reason for the backward state of Ireland in the early nineteenth century, and the prevalence of agitation and insecurity was the obvious ground for its absence. This was very succinctly stated by Nicholls in his report on a Poor Law for Ireland: 'Want of capital produces want of employment,—want of employment, turbulence and misery,—turbulence and misery, insecurity—insecurity prevents the introduction or accumulation of capital, and so on.'[4]

[1] *Poor Laws—Ireland. Report of Geo. Nicholls, Esq., to His Majesty's Principal Secretary of State for the Home Department* (London, 1837), p. 7.

[2] *A Letter to His Grace the Duke of Devonshire on the State of Ireland, and the General Effects of Colonisation* (Calcutta, 1824). For some account of Wheatley's work, see F. W. Fetter, 'The Life and Writings of John Wheatley', *Journal of Political Economy*, vol. l, No. 3, pp. 357–76.

[3] Wheatley, op. cit., p. 7.

[4] Nicholls, op. cit., p. 20.

There was no lack of schemes for the stimulation of investment, both private and public, but such proposals had little support from the economists in the years before the Famine. In general they were disposed to regard the introduction of capital as a long-term process, and one in which goverment intervention was not appropriate in any fashion more direct than encouraging investors by improving the political climate. All the major English writers took it as axiomatic that trade between England and Ireland could no more be influenced by tariffs, bounties, or other means than could trade between England and Wales. Hence a policy of deliberate industrialization simply did not come within the bounds of discussion, and it was obvious that without government intervention Irish industry could not develop to compete with English manufactures. This same fact, on the other hand, served to bring the question of industrial development to the fore in Ireland, and in the thirties and forties of the nineteenth century there were quite a number of Irish advocates for subsidized or protected industry. Most of their arguments were based on sentiment rather than reason, and involved a sublime disregard of such points as Ireland's lack of raw materials for native industry.

But Ireland did produce one economist of repute whose advocacy of protection cannot be dismissed in this way. This was Isaac Butt, who held the Whately chair of Political Economy at Trinity College, Dublin, from 1836 to 1841. In 1846 Butt published two lectures, first delivered in 1840, under the title *Protection to Home Industry; some Cases of its Advantages Considered.* In these he argued that protective tariffs 'may bring into action and play sources and powers of production in a country, which but for their existence, would be utterly waste and unproductive' and applied this conclusion to Ireland, where the existence of such underemployment and unemployment seemed to him undeniable.[1] Butt's general acceptance of the classical position in his other writings makes his approach to the subject of protection all the more interesting, but at the same time emphasizes how exceptional it was. To virtually all his contemporaries it seemed clear that agriculture provided the only real field for investment in Ireland, and heavy capitalization of agriculture would not be possible without an increase in the size of the farm unit. On this ground most of the economists opposed peasant proprietorship or fixity of tenure as likely to perpetuate the existing inefficient methods of small-scale agriculture. The argument can be found concisely stated by Torrens:

[1] See Butt, *Protection to Home Industry*, p. 15 and *passim*. It is interesting to compare Butt's approach with that of Malthus, who held the state of Ireland to be 'as much owing to a want of demand as a want of capital' (*Principles of Political Economy* (London, 1836, reprinted by London School of Economics, 1936), pp. 348–50). For a further account of Butt's economic writings, see the present writer's papers 'Economic Studies at Trinity College, Dublin', in *Hermathena*, No. LXX, Nov. 1947, and No. LXXI, May 1948.

'*The want of combined labour and capital on the land, is the cause of the low effective powers of agricultural industry in Ireland.* Industry performs her miracles only when many hands are employed at the same time upon the same work. In England a farmer possessing adequate capital, cultivates 500 acres with the combined labour of fifteen hired labourers; and therefore the produce is large in proportion to the number of hands employed in raising it. In Ireland, a peasant, nearly destitute of capital, cultivates ten acres by means of his own isolated and unassisted exertions; and therefore the quantity of produce is small, in proportion to the quantity of labour employed in raising it. . . . When the cause of the poverty of Ireland is placed in the proper point of view, we see at once the nature of the remedies which ought to be applied, and the extent of the difficulties which are opposed to their application. Two objects must be accomplished. In the first place, farms must be consolidated, until the agricultural labour of Ireland can be performed by two-fifths of the labourers now employed in performing it; and in the second place, adequate provision must be made for maintaining the other three-fifths of the present agricultural population, which the consolidation of farms must displace from their small holdings.'[1]

Two possibilities might be considered to exist at this stage of the argument: either to remove the surplus population by emigration or to open up alternative sources of employment through public works. For various reasons the orthodox economists did not place much faith in the latter. Since they held that expenditure on public works must be financed out of taxation, it followed that this could only be a diversion of funds from private to public use, an alteration in the channels through which the wages-fund was expended.[2] Furthermore, application of Malthusian principles led to the conclusion that the temporary stimulus of public works expenditure would increase population without increasing subsistence:

'If . . . the main object of the formation of public works were to effect a permanent improvement in the condition of the poor, the measure would be of very doubtful expediency. Unless the increase of employment were sufficient to create an entire change in the habits and ideas of the people, it would only serve to give a fresh impulse to population, and however great the rise of wages might be while roads, etc., were being made, it would be very unlikely to last after they were finished.'[3]

Aside from scruples prompted by theory, opposition to public works expenditure sometimes stemmed from the belief that Irish landlords sought government assistance as a means of evading their own responsibilities. Thus Ricardo wrote to Hutches Trower:

'It is a favourite plan, with many, for Government to lend capital to Ireland, in order that people may be employed. Against such a scheme I have the most decided objections, which I never fail to urge. If the greater part of the Irish members

[1] Torrens, *Plan of an Association in aid of the Irish Poor Law* (London, 1838), pp. 6 and 8. (Italics in original.) The same argument is repeated, in part *verbatim*, in Torrens's other works, *The Colonisation of South Australia* (London, 1835) and *The Budget*, Letter V (London, 1842). Cf. Merivale, *Five Lectures on the Principles of a Legislative Provision for the Poor in Ireland* (London, 1838).

[2] For examples of the application of this argument to Ireland, see Merivale, op. cit., pp. 74 sqq.; Ward, *First Step to a Poor Law for Ireland* (London, 1837), p. 6; Smith O'Brien, *Plan for the Relief of the Poor in Ireland* (London, 1830), p. 14.

[3] Thornton, *Over-Population and its Remedy* (London, 1846), p. 418.

could have their way, we should not only grant a vast number of charitable loans but we should encourage all sorts of manufactures by bounties and premiums. . . . The Irish appear to me to differ from the rest of the inhabitants of the United Kingdom, and not to take a commonly enlightened view of their own interest. They have no idea of waiting patiently for the profitable result of a well-considered speculation. An English landlord knows that it is not his interest to make his tenant a beggar by exacting the very hardest terms from him if he had the power of dictating the rent, not so the Irish landlords—they not only do not see the benefits which would result to themselves from encouraging a spirit of industry and accumulation in their tenants, but appear to consider the people as beings of a different race who are habituated to all species of oppression. . . . Ireland is an oppressed country—not oppressed by England, but by the aristocracy which rules with a rod of Iron within it.'[1]

In general, the prevailing trend of opinion was well summed up by J. R. Godley when he wrote:- 'It is idle to hope that the balance between employment and labour will be redressed by increase of employment alone; nay, the actual excess of numbers is an impediment fatal to the beneficial operation of measures intended to increase employment.'[2]

So if the population–capital ratio could not be significantly improved by introduction of private or public funds, the only alternative was to reduce the population by a system of emigration or colonization. This was the solution advocated over a period of years, in and out of Parliament, by Wakefield, Godley, and Wilmot Horton, and it had the support of such economists as Senior, Torrens, and Wheatley.[3] Reduction of the population would allow the consolidation of holdings into larger units, which alone could improve the productivity of agriculture through the introduction of capitalist tenant farming on the English model, employing the remaining cottiers as agricultural labourers.

It was generally agreed that this policy if carried into effect on any large scale would involve an awkward period of transition between the removal of the peasantry from their holdings and their absorption into the proposed new forms of employment, at home or abroad. Although Malthusian principles generally led economists to oppose the granting of relief to able-bodied persons, some, notably Torrens and Merivale, were prepared to advocate the introduction of a Poor Law into Ireland to tide over this period of transition.[4] Others, however, such as Senior, maintained a uniform opposition to relief and placed their reliance solely on rapid and extensive emigration.[5]

[1] *Letters of David Ricardo to Hutches Trower and others*, Ed. Bonar and Hollander (Oxford, 1899), Letter 62, 24 July 1823, pp. 207–8.

[2] Godley, Memorandum to the Rt. Hon. Lord J. Russell, 23 March 1847, p. 3. For an account of the origin and consequences of this memorandum, see Morrell, *British Colonial Policy in the Age of Peel and Russell* (London, 1930), pp. 429–35.

[3] See Wheatley, op. cit.; Torrens, *Colonization of South Australia*; Senior, *Remarks on Emigration* (London, 1831); Wilmot Horton, *Causes and Remedies of Pauperism* (London, 1830).

[4] Torrens, *A Letter to Lord John Russell on the Ministerial Measure for establishing Poor Laws in Ireland* (London, 1837); Merivale, *Five Lectures on the Principles of a Legislative Provision for the Poor in Ireland.*

[5] Cf. Senior, *A Letter to Lord Howick on a Legal Provision for the Irish Poor* (London, 1831).

This then was the diagnosis and treatment which the classical economists offered for the maladies of pre-Famine Ireland—population had become excessive in relation to the means of providing employment for it; the remedy must be sought in consolidation of holdings, the condition precedent for an improved agriculture. Since this would involve the eviction of considerable numbers of the peasantry, those who could not be re-employed must be assisted to emigrate, and poor relief be provided for them if necessary in the interim.

In the newspapers, magazines, and pamphlets of the period these ideas are to be found widely accepted and repeated, and the major acts of policy appear to follow along the lines suggested. Measures such as the Sub-Letting Act of 1826 and the Poor Law of 1838 were in accordance with the teaching of classical doctrine, but it would be dangerous to assume that they followed from it. The fact is that most economists down to the time of John Stuart Mill accepted as one of the basic postulates in their theory not only private property in land but also a landlord system, and in the framing of policy for Ireland at the time the landed interest was dominant. In these circumstances it is not surprising that theory and policy should coincide to some extent, but coincidence rather than consequence seems to be the true description of their relationship. This view gains support from the fact that there was no attempt to implement the policy which followed from analysis *as a whole*. The corollary of consolidation was emigration, aided by the State and softened by a Poor Law. Yet no measure to promote systematic emigration was ever introduced, and contemporary evidence suggests that the Irish Poor Law was more the result of fears of the competition of Irish paupers in the English labour market than anything else. Yet although the politicians of the day did not carry into effect the measures which the economists proposed, they made frequent appeals to the 'principles of Political Economy' in justification of their actions.[1]

In part because the policy which the economists advocated was often stated baldly in the abstract and appeared harsh on that account, in part also because the politicians often took refuge behind the doctrine of *laissez-faire* as an excuse for inaction, the popular attitude to the schemes of political economists for Ireland was often one of bitter opposition. Bryan, in his *Practical View of Ireland*, expressed a common opinion when he wrote:

'. . . the disciples of Malthus conceive that the landowners, who are the legislators, *can do no wrong*. Their political economy was well defined by the late Mr. Hazlit, as the *divine right of landlords*. According to this school, there are to be no checks to inordinate power, no countervailing measures to arrest the evils produced by its existence.'[2]

[1] For a typical, and amusing, example of this, see J. R. Elmore's account of Lord Liverpool's reception of a deputation seeking relief for Ireland in 1825—Elmore, *Letters to the Earl of Darnley* (London, 1828), pp. 126 et seq.

[2] Bryan, *Practical View of Ireland* (Dublin, 1831), p. 118. (Italics in original.)

This opposition to political economy reached its height at the time of the Famine, when there was a widespread impression that Lord John Russell had allowed his respect for the principles of political economy to outweigh his consciousness of the need for relief—a view which a twentieth-century biographer, A. Wyatt Tilby, has endorsed.[1] The events of this period in Ireland roused Carlyle to a vehement denunciation of the principle of *laissez-faire* and its supporters:

'Supply and demand; is there in Nature or the general experience of men's life any reason to expect that by the simple method of letting every thing alone, human society will be able to manage itself? . . . In opposition to all Doctors present past and future, with never such wigs, and faculty of bow-wowing and chopping heavy or light logic, I take the liberty to assert the direct contrary to all this. . . . I say, it is for ever the duty and necessity of every wise man to control and command fools, with or against their votes as the case may be; and on the whole to take care, so far as lies in him, that Folly and Insanity and the Devil so called, which I think must mean misknowledge of the divine laws if he means anything, do *not* reign in this world. And I rejoice to see that he will and must do it too, in spite of the Doctors, that a day comes, that a day has already come, when the Doctor's world with its pig-trough gospels, and moral law of "eat thy pudding", and thousands of white-stoled and other Phantasms, and corresponding millions of ragged Irish mendicants, becomes too ugly for every wise man; urges him irrepressibly to ask said world "who made it, or what it means, then?" and on the whole to detect it for a brutal cloaca, in which he must interfere or else die.'[2]

It may be said that these ideas are typical of Carlyle, whereas Carlyle was not typical of his time; but he was by no means alone in his wrath against the economists, as is shown by the following passage, a sample from amongst many written in the Famine years:

'The Premier of England is reported to have said not long since, "that nothing prevented him from employing government vessels to carry bread to a starving people, except his unwillingness to disturb the current of trade". Never was oracle of a hidden and heartless deity uttered more faithfully, or more in accordance with the worship of its votaries, than in the language here imputed to the British minister, who may fairly be regarded as the living high priest of political economy.'[3]

Apart from such whole-hearted denunciations of 'the cold political-economy mongers' there were more discerning criticisms offered by those who saw that the fault lay less with political economy than with the misapplication of its theories. This was pungently stated by a critic of Hancock's *Impediments to the Prosperity of Ireland* (1850), a work which raised *laissez-faire* to the level of a panacea:

'Here we have an exposition of the doctrine in the shape of a *reductio ad absurdum*, by its professor! A fair specimen of the cold-blooded and conceited school of the

[1] See A. Wyatt Tilby, *Lord John Russell, a Study in Civil and Religious Liberty* (London, 1930), pp. 89–91.

[2] From 'The Rakes of Mallow', unpublished manuscript of Thomas Carlyle, *c.* 1848, now in the possession of Yale University Library. Reproduced by permission of the Library Committee of Yale University.

[3] Hughes, *Antecedent Causes of the Irish Famine* (New York, 1847), p. 20.

writer! The science they teach is not political economy, but the abortion and adulteration of it. If the teachings of the Professor carried public weight, he would be himself the greatest "Impediment to the Prosperity of Ireland" in existence!'[1]

Indeed by the time of the Famine, and even before it, it was coming to be realized that the Irish problem could not be fitted into the simple mould of the population-and-capital analysis, nor solved by application of the methods of English agriculture:

'So in regard to the state of things in Ireland, the Sciolists of political economy having got a conception of one or two abstract truths, (for it must be noted that I do not deny them, in the abstract, to be truths) insist that they, and they only, are the fitting prescriptions for Ireland. They overlook what are the natural impediments of the ground upon which they have to work, and the comparative immaturity of the resources and of the social progress of the people.

'Such Sciolists are disconcerted when any question is raised as to the applicability of the truths which they, as the Pharisees of Political Economy, have fastened in phylacteries upon their obtuse and hardened foreheads.'[2]

There was an alternative solution, which in the years between 1845 and 1870 gained favour with some of the most distinguished classical economists; this was the introduction of peasant proprietorship, or its equivalent, with improved methods of cultivation and reclamation of waste lands. Such an approach had been advocated as early as 1834 by William Blacker, who had carried out successful experiments in raising the productivity of small farms on the estates for which he was agent, in County Armagh.[3] Economists such as Senior and Merivale opposed Blacker's schemes as liable to result only in temporary benefits leading ultimately to further increases of population. As matters stood in Ireland before the Famine there was undeniable force in their view, and it is difficult to believe that any scheme for peasant proprietorship could have succeeded without some accompanying measure to reduce the numbers dependent on agriculture —for such a measure the relatively slow process of reclaiming waste lands could hardly have been a substitute. Yet the success of peasant proprietorship on the Continent was undeniable, and gained supporters for the small farm system not only in Ireland but in England during the eighteen-forties. Amongst economists, Poulett Scrope and W. T. Thornton[4] were staunch advocates, but the most famous and respected protagonist of

[1] Seymour, *How to employ Capital in the West of Ireland* (London, 1849), p. 210.

[2] Stoddart, *The True Cure for Ireland, the Development of Her Industry* (London, 1847), p. 17.

[3] See Blacker, *Prize Essay, Addressed to the Agricultural Committee of the Royal Dublin Society, on the Management of Landed Property in Ireland* (Dublin, 1834).

[4] See Thornton, *A Plea for Peasant Proprietors, with the Outlines of a Plan for their Establishment in Ireland* (London, 1848). Scrope was the author of numerous pamphlets on the Irish Question, amongst which the most important are: *Plan of a Poor-Law for Ireland* (London, 1833); *How is Ireland to be governed?* (1st ed., London, 1834, 2nd ed., 1846); *The Irish Difficulty, and how it must be met* (London, 1849). For a chronological (but not complete) bibliography of Scrope, see Opie, 'A Neglected English Economist, George Poulett Scrope', *Quarterly Journal of Economics*, vol. xliv, pp. 101–37.

peasant proprietorship for Ireland was John Stuart Mill, who carried on a vigorous campaign in favour of it in the columns of the *Morning Chronicle* during 1847, and afterwards incorporated his views in his *Principles of Political Economy*.[1]

In later years the case for peasant proprietorship was stated and supported by the great free-trader, John Bright, who had perhaps done more than any man to make economic theory into practical politics. Mill and Bright, in their different ways, were the embodiment of the classical tradition, and as such their speeches and writings exemplify a fundamental change in the attitude of the orthodox economists to the Irish question. In the years before the Famine those economists had tended to think that the solution of the question lay in the assimilation of Irish institutions to the English model; after 1847 it was recognized that Irish conditions demanded special treatment. Many statements of this can be found in contemporary writings, but Mill's is by far the best:

'We had got a set of institutions of our own, which we thought suited us—whose imperfections we were, at any rate, used to; we, or our ruling classes, thought that there would be no boon to any country equal to that of imparting those institutions to her, and as none of their benefits were any longer withheld from Ireland, Ireland, it seemed, could have nothing more to desire. What was not too bad for us, must be good enough for Ireland, or if not, Ireland or the nature of things was alone in fault.... The difficulty of governing Ireland lies entirely in our own minds; it is an incapability of understanding.... If we cannot distinguish the essentials from the accidents of landed property; if it is and must remain to us the Ark of the Covenant which must be neither touched nor looked into, for however indispensable a need, it is our duty to retire from a country where a modification of the constitution of landed property is the primary necessity of social life.'[2]

To have recognized and stated these points was a great step forward, but in regard to the tendencies of classical economics to generalize from models based on English institutional assumptions, Mill was only rediscovering a point which had been made 35 years earlier by a less famous economist, Richard Jones:

'There are persons among us, and of no mean rank in the intellectual world ... who think that English political economists may allowably consider the state of things about them, if not as a picture of the condition of the world, yet as a pattern towards which the institutions and economical habits of other nations are approaching with a quicker or slower motion; who believe that while we study our own economical elements and conformation, and those only, if we do not get a knowledge of the phenomena which the rest of the people of the earth present to the philosopher as his materials, we shall at least get a knowledge of a state of things, which will one day be theirs and is destined to be universal.... Gentlemen, I cannot join in these views.'[3]

[1] Mill, *Principles of Political Economy*, bk. ii, chap. x (1st ed.), vol. i, pp. 381–400. Mill altered this chapter in 1856 and again in 1865. Cf. 6th ed., vol. i, pp. 404–18.

[2] Mill, *England and Ireland* (London, 1868), pp. 8 and 41.

[3] Jones, *An Introductory Lecture on Political Economy, delivered at King's College, London, 27th February, 1833* (London, 1833), p. 20. Reprinted in *Literary Remains*, ed. Whewell (London, 1859), p. 558.

This to some extent contains the answer to the second question posed at the beginning of this article—How far did consideration of the condition of Ireland produce modifications in classical theory? If the classical economists were disposed to regard contemporary English circumstances as a norm, clearly the different position of Ireland would have little influence on their doctrine. And although they became increasingly prepared to admit that Ireland was a special case, this did not to any marked extent affect the main body of classical analysis.

There were, however, certain marginal adjustments. Discussions of the problem of Irish absenteeism led to certain advances in the analysis of unilateral transfers, but a full account of this controversy and its results would require a paper in itself.[1] The theory of population was another disputed field in which examination of Irish conditions produced some modifications. Ireland was always a favourite example for population problems, but the conclusions of Malthus were by no means universally accepted; indeed one of the best known opponents of Malthusianism, Michael Sadler, made frequent reference to Ireland in support of his case.[2] From all such attacks the Malthusian doctrine emerged more or less unscathed, but in one respect at least its advocates were compelled to modify their views by a consideration of the circumstances of Ireland. This was in regard to the introduction of poor laws. Ricardo, Malthus, and McCulloch had, in the eighteen-twenties, inveighed against any such measure being applied to Ireland on the ground that it would only act as a further stimulus to population, and increase the misery of the people. Against this, men such as Poulett Scrope and Bishop Doyle[3] pointed out that poverty was a cause of early marriages, rather than that the reverse was true. John Black, the editor of the *Morning Chronicle*, took up a similar standpoint, with results described by John Stuart Mill:

'. . . Black, as I well remember, changed the opinion of some of the leading political economists, particularly my father's, respecting Poor Laws, by the articles he wrote in the Chronicle in favour of a Poor Law for Ireland. He met their objections by maintaining that a Poor Law did not necessarily encourage over-population, and he convinced them that he was in the right.'[4]

[1] The author hopes to treat this and other related topics more fully in a forthcoming book on 'Economic Thought and the Irish Problem, 1800–1870'. A full account of the impact of the absentee question on the theory of international trade is to be found in Viner, *Studies in the Theory of International Trade* (New York and London, 1938); cf. pp. 320–2.

[2] Sadler, *The Law of Population; a Treatise, in Six Books, in Disproof of the Superfecundity of Human Beings, and developing the Real Principle of their Increase* (London, 1830). See especially vol. ii, chaps. xi, xvi; also *Ireland, its Evils and their Remedies* (London, 1829), *passim*.

[3] Scrope, *Plan of a Poor-Law for Ireland, with a Review of the Arguments for and against it* (2nd ed., London, 1834), p. 12; (Doyle) *Letters on the State of Ireland, addressed by J. K. L. to a Friend in England* (Dublin, 1825), p. 363.

[4] J. S. Mill to Robert Harrison, 12 Dec. 1864, in Elliott, *Letters of John Stuart Mill* (London, 1910), vol. ii, p. 14.

McCulloch, in evidence before the Select Committee on the State of the Poor in Ireland in 1830, frankly admitted this change of ideas and disavowed the evidence he had given before an earlier committee in 1825:

'Additional study, and reflection upon the accounts given by writers and others thoroughly acquainted with the practical operation of the poor laws in England, as to their real working and effects, have led me to alter the opinion given in the evidence quoted. That evidence was founded too much upon theory; I was too much imbued at the time with the opinions of Mr. Malthus and Mr. Townsend, I had looked too exclusively at the operation of the system upon the poor, and did not make sufficient allowance for the checks that it naturally brings along with it.'[1]

Irish conditions also formed the basis for certain criticisms of the Ricardian theory of rent, notably those of Thomas Hopkins.[2] Exponents of that theory used it on occasion to prove that high rents were not the cause of Irish distress, and remission of rent therefore not the answer to the problem;[3] it was this use of the theory which angered Hopkins and others. Here again, however, the fault lay not so much in the theory as in the misapplication of it. Economists who studied the conditions in Ireland at all closely were quick to point out that they were a travesty of those assumed by the Ricardian theory:

'The application of the principle of *supply and demand* to the case of rent may be seen strikingly exemplified in the circumstances under which land is let in Ireland. In that country, from the deficiency of employment for the labouring population, and from the practice which has prevailed of letting land in minute portions, and sacrificing the permanent improvement of estates to the object of obtaining the greatest amount of present rent; the possession of land is sought, not by capitalists for the purpose of profit, but by mere labourers for the purpose of obtaining the bare means of subsistence. The number of those who have no other resource being excessive, in reference to the opportunities of obtaining land, an extreme degree of competition exists among them, and they eagerly offer any rent by which they may obtain their object. This is the reason why we so often hear of the extremely high rents at which land is let in Ireland.'[4]

So again the main body of the theory remained unaffected, but its assumptions were shown to require modification in reference to the Irish case. This raises again the vital question of how far the classical economists regarded their assumptions as applicable to Ireland. What has already been said is enough to show that they often tended to think of English conditions, with regard to which their theories were first framed, as a norm

[1] McCulloch, answer to Q. 6569, Minutes of Evidence before the Select Committee on the State of the Poor in Ireland, *Reports from Committees*, 1830, vol. vii, p. 591.

[2] Hopkins, *On Rent of Land* (London, 1828), *passim*.

[3] See, for example, Torrens, *Letter to Lord John Russell on the Ministerial Measure for establishing Poor Laws in Ireland* (London, 1837), p. 46.

[4] Wilmot Horton, *Lectures on Statistics and Political Economy* (London, 1832), Lecture VII, pp. 8 and 9.

to which Irish conditions ought to be adjusted; but this is not the same thing as saying that they assumed them to be the same.

The classical analysis, in its general form, involved as main assumptions freedom of contract, full employment, and mobility of factors, which last implied the further assumption of a variety of occupations for them. Study of the writings of classical economists clearly shows that they did not regard freedom of contract as existing in any real sense in Ireland in regard to the only contracts which there mattered—those for the leasing of land. Nor were they blind to 'the deficiency of employment for the labouring population' and the extreme dependence of the labourers on agriculture. Exceptions to these statements could be found, but they are true on the whole. In general, too, the classical diagnosis of the Irish problem must be admitted to have been sound in its emphasis on the growth of population, while the remedy prescribed was logically consistent. It cannot be dismissed as an example of 'the heartless doctrine of *laissez-faire*'—viewed economically, it was not an instance of *laissez-faire*; rather it represented a programme of action designed to create the conditions within which free enterprise could work. Viewed socially, it was not heartless, for there is no reason to believe that those who advocated it did not desire the regeneration of Ireland, and were not anxious to minimize hardship; rather they felt that easier courses might lead to greater evil.

Yet this does not mean that the classical economists' policy for Ireland was the right one; at the distance of a century it can be seen clearly enough that even had the policy implications of the population-and-capital doctrine been followed through in full this would not have produced the desired result. Even had clearances succeeded it may be doubted if capitalist tenants could have been found for the larger farms; they would not have risen from the ranks of the Irish cottiers, and they could scarcely have been attracted from England, where well-established farms were already to be had in the open market. Further, had the capitalist tenants been forthcoming, their obvious interest would have been to utilize their farms as pasture; and pasture would not employ those numbers of labourers which the economists expected, reasoning from the example of English high farming.

Indeed, considering the classical economists' attitude to Ireland generally, the verdict of an anonymous contemporary seems just, although applied by him to a narrower group:

> 'The Liberal writers, who, for years passed, have occupied themselves on the painful subject of Ireland in the pages of the "Edinburgh Review" have been ungracious in the manner of framing their prescriptions. They aimed at being philosophical, not practical. If the remedies they proposed were theoretically right, it mattered little to them, whether they were suited to the temper, the feelings, or

habits of the Irish people. It is not sufficient, however, that measures should be good in themselves; the time, and manner, of their application are essential ingredients in their success. To form an accurate judgment on these important points, the statesman should be intimately acquainted with the feelings that influence the people, for whom he legislates. The want of this knowledge, and the indifference to its acquirement, have marred the effect of the best intentions.'[1]

THE QUEEN'S UNIVERSITY OF BELFAST.

[1] *Remarks by a Junior to his Senior, on an Article in the Edinburgh Review of January, 1844, On the State of Ireland and the Measures for its Improvement* (London, 1844), p. 8. This is a punning title—the original article was the work of Senior.

EARLY ENTREPRENEURIAL BEHAVIOUR IN RELATION TO COSTS AND PRICES[1]

By W. WOODRUFF

THIS article purports to describe certain aspects of the costing and pricing procedure of the early rubber manufacturing industry, particularly that branch of the industry located in the west of England. It does not provide a new theory of the price mechanism, but merely a particle of the evidence that remains to be gathered and interpreted before a satisfactory price theory can be formulated.[2]

I

In 1848, less than a decade after the discovery of vulcanization[3] had extended the application of rubber to the mechanical field,[4] and half a century before the rise of the pneumatic tyre industry, Stephen Moulton,[5] having recently returned to this country from the United States, established a small rubber manufactory at Bradford-on-Avon in the West Country. The only other rubber house of any consequence operating at this time was Chas. Macintosh & Company of Manchester, formed in 1825, and until Moulton began to manufacture under his own patent in 1849,[6]

[1] I have received willing co-operation from many branches of the British Rubber Industry. My thanks are especially due to Messrs. George Spencer, Moulton & Co. Ltd., of Bradford-on-Avon, the North British Rubber Co. Ltd., of Edinburgh, and the Birleys (originators with Charles Macintosh of the pioneer firm of Chas. Macintosh & Company) for placing their early records at my disposal; to the staff of the Research Association of British Rubber Manufacturers at Croydon, who have spared no pains to help me in my work; to the Houblon–Norman Committee for financial aid; to my colleagues at Nottingham, and to an Oxford friend, Mr. J. R. Kirwan, for valuable assistance. My paper has also benefited greatly from the criticism of Mr. P. W. S. Andrews, Mr. R. F. Kahn, and Mr. T. Wilson. The manuscript references are from the Moulton, the North British, and the Birley Papers.

[2] I hope this statement will not be misinterpreted as a presumptuous evaluation of my own contribution; I readily acknowledge the limitations of an article of this kind. Given the opportunity I shall have more to say on this subject as my research progresses.

[3] A sulphur-heat process discovered by the American, Charles Goodyear, in 1839. The vital fact of this discovery is that in combining rubber with sulphur and lead at a high temperature Goodyear imparted to rubber a durable quality which it had not hitherto possessed.

[4] Strictly speaking, the employment of rubber with machinery. The growth of industrialization in the second half of the nineteenth century, coupled with the discovery of the vulcanizing process, greatly accelerated the application of rubber mechanical devices such as railway buffer, bearing, and drawer-bar springs and rings; valves, washers, and packing for steam-engines; hose and tubing; belting, &c.

[5] The life of this nineteenth-century industrialist is being dealt with in my wider study (in preparation for the press) on the rise of the British Rubber Industry.

[6] The English Master Patent for the vulcanization process was held by Thomas Hancock (a partner of the Macintosh undertaking), who entered his specification on 28 Nov. 1843, eight weeks before Charles Goodyear belatedly applied for his English Patent. Moulton's patent—unlike those of Charles Goodyear and Thomas Hancock—prescribed lead thiosulphate as the vulcanizing agent. See an article by the author, 'Origins of an Early English Rubber Manufactory', *Harvard Bulletin of Business History*, vol. xxv, No. 1, Mar. 1951.

possessing a temporary monopoly of the manufacturing process. Another pioneering firm mentioned here whose early records have been examined for the purpose of this article was the North British Rubber Company founded by a group of Americans at Edinburgh in 1855.[1]

All these companies were multi-product manufacturers, and a rough idea of their relative size a century ago can be gained from a comparison of their annual sales. In 1860, for instance, Moulton's total annual sales were approximately one-tenth of Macintosh's sales, which stood at £300,000; while those of the North British were probably in the region of £150,000. In terms of economic weight the Manchester Company was larger than either of its rivals and remained so, though the Bradford house found it possible to sell its wares (akin in most respects to those of the other two companies) in the same market, while the Edinburgh Company was soon to make a bid for price leadership.

II

Firstly a word about general market conditions. In the 5 years from 1850 to 1855 Moulton's sales grew rapidly from £2,000 to £30,000; yet, as the accompanying Chart A shows, 1855 was a high-water mark. The rise was soon halted (in fact with the end of the Crimean War in sight at the fall of Sebastopol in September 1855, sales fell as quickly as they had risen) and not until 1872, by which time Stephen Moulton had established himself as a specialist in the manufacture of rubber parts for the railways, did the record sales of the middle fifties recur.

This development in sales may be partly accounted for by factors outside the rubber industry. The rapid increase in the early fifties (accompanied by a rise in the total imports of crude rubber into the United Kingdom as is shown in Chart B) might be regarded as part of the general upswing in commercial and industrial activity culminating in the collapse of 1857. In the same way Moulton's recovery in 1859 accords with the general improvement, and the effect of the business crises of 1857 and 1866 in curtailing the demand for most products is reflected in Moulton's sales chart for manufactured rubber. Conversely, the commercial crisis of 1873 had no important influence on the trend of his sales, though in this (as the declining imports of crude rubber bear out) he was more fortunate than

[1] Beyond the reach of Thomas Hancock's English Patent for vulcanization granted in 1843. To found their business in England the North British Company would either have had to pay royalty to the Macintosh Company or disprove the validity of Hancock's patent. It was the Patent Law Amendment Act of 1852 which made it possible to obtain one patent (instead of the customary three under the old Patent Laws) for the whole of the United Kingdom. If Hancock at the outset had protected his patent in Scotland he would have been in a position to dictate to the Americans. As it was they quickly invaded his markets from north of the border.

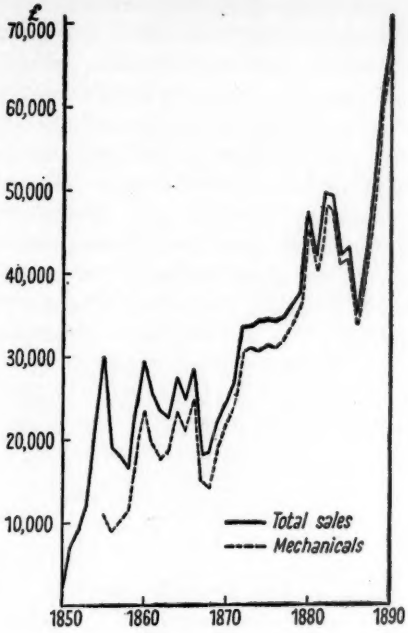

CHART A.

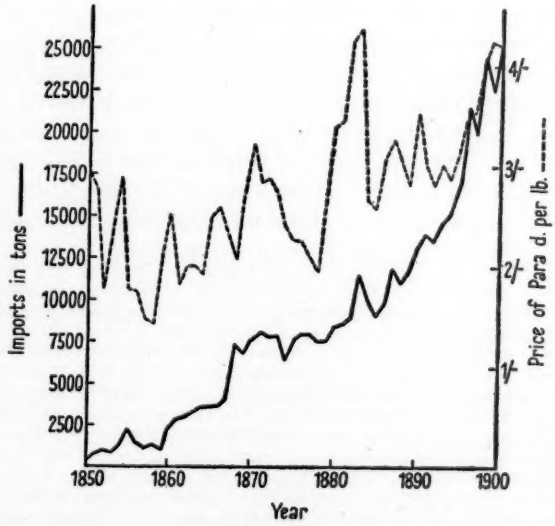

CHART B.

his rivals; whilst in spite of the growing market for india-rubber goods the impact of the business fluctuation of 1882–3 was equally as severe (in curtailing Moulton's sales) as any of the commercial and industrial crises that preceded it. The fact that the rubber trade did not show the tendency to depression which affected most trades adversely in 1893 is attributed—in particular for the Moulton Company—to the extraordinary demands for railway mechanicals, and for the industry as a whole to the cycling craze of the late Victorian era.

Turning to the special circumstances affecting the market for india-rubber commodities in the period 1850–60, the sharp fall in sales experienced by the Bradford Mill in 1856 resulted particularly from the general recession—Chart B shows the decline in the imports of crude rubber—but also from the aggressive sales policy of the Macintosh Company, who by this time had reacted strongly to Moulton's invasion of the English market.[1] With the appearance of the American Company in Edinburgh in 1855 the struggle for markets was intensified.[2]

III

The pricing of Moulton's first products was done by the general merchants, who not only priced and distributed the finished goods but also provided the working capital to make them: 'At your express wish', wrote Moulton's chief distributor in 1850,[3] 'it was arranged that the prices should be fixed as soon as the market value could be ascertained', and it was in these circumstances that the level of prices was influenced more by what the market would bear (in the light of what Macintosh was already charging for similar goods) than by the Bradford manufacturer's costs. It was for the merchant and the manufacturer to arrive at a compromise on price; one that met both their points of view as well as the conditions of a market supplied by no more than two or three manufacturers. At the outset for Moulton to be able to undersell Macintosh's goods by 'the smallest trifle'

[1] Coleman, London/S.M. 18 Sept. 1852: 'You said your business was exclusive. It's competitive . . .'; and (14 Apr. 1852), Pumphrey & Co. of Birmingham, warned Moulton that 'Mac's goods will soon regain the place they held before the introduction of yours . . .'.

[2] One of the strongest incentives drawing Moulton and the originators of the North British Company to Britain was the growing English market dominated by the Macintosh group. The temporary monopoly of the Manchester House—and the supposedly large gross profit margin that went with it—was challenged by Moulton when he began to manufacture under his own patent—in 1849, and his example was followed in 1855 by a group of Americans who were wise enough to locate their industry in the Scottish capital beyond the reach of Hancock's master patent in 1843.

[3] Price Coker & Co., London/S.M. 12 Aug. 1850 and 9 Sept. 1850: 'We have all along advanced more than the amount of goods sold. . . . We have advanced you £5,000 for the purpose of being laid out and expended in the manufacturing and production of such goods as you can make. . . .'

was to secure 'large orders for C.O.D.'; but to cast them above the Manchester Company's prices 'effectually stopped the sale of the article'.[1]

The circumstances by which the Bradford manufacturer achieved financial independence of these 'pettyfogging' merchants (as he chose to call them) are not relevant here and must be passed over. It will suffice to say that by the early fifties the direct trade with collieries, wagon works, engineers, foundrymen, and wholesalers and retailers (particularly with the government departments, and the railway companies) outweighed the indirect distribution through the general merchants; which meant that price policy could now be determined solely by the manufacturer.

In the case of a new article, or a new composition, the first step was to prepare a cost analysis of a trial batch or short-run production period, as is done below:[2]

Estimated Cost of 1200 lb. Nett of Spring Rubber, being about *One* days Manufacture for the Kingston Mills supposing the Works to be *fully and wholly* employed in making that description of Goods:

		£	s.	d.
Para Rubber (including Dock Rent, Carriage, &c.)				
	300 lb. @ 1/10*d.*	27	10	0
Java Rubber	300 lb. @ 9*d.*	11	5	0
Whiting	312 lb. @ ¼*d.*		6	6
Chemicals	336 lb. @ 3¼*d.*	4	11	0
		43	12	6

	£	s.	d.			
Wages	2	12	0			
Cost of Packing Materials		10	0			
Breakage of Moulds		7	0			
Coals for Engines		14	0			
Office & General Expenses	1	13	4			
Salaries to Sundry	1	15	0			
Interest on Capital & on Mortgage	3	8	0			
				10	19	4
				£54	11	10

If 1200 lbs. = 13102*d.*, one pound, say 11*d.*

It is noteworthy that he should have thought fit to add:

It must be understood that the basis of the above calculations is founded upon the idea that by incessant grinding during the 24 hours, without a moment's respite, and excluding all other descriptions of Manufacture, the above results might be

[1] Price Coker & Co., London/S.M. 9 Sept. 1850, and 8 Jan. 1852, Braithwaites, London/S.M. Earlier on 23 Oct. 1850 Braithwaites had written: 'In looking over Hancock's [Macintosh's] prices for vulcanized piping I find that he charges considerably less than you do . . . he charges for piping 1″ internal diam. 2/- per foot and for 1¼″ diam. 2/8*d.* while you charge 2/6*d.* and for 1⅜″ 3/6*d.* Messrs. Huth are under the impression that you are under Hancock's price for piping. I enclose you a copy of H's prices wherein you will see that you are considerably lower than he is both in the price of washers and packing, but in piping much higher. Please see to this.'

[2] Macintosh Papers.

obtained, but it will be borne in mind that no allowance is made for Rubber occasionally spoilt in curing, as well as loss by heavy adulterations of sand with the rubber, beyond the ordinary average—paper statements in such cases being fallacious.

However fallacious this or other cost estimates may have been, they evidently were relevant to price fixing. Moulton's calculation based on this estimate for Spring Rubber (which allowed for a profit margin of 20 per cent., and a discount of 30 per cent.[1]) shows a selling price of 1*s.* 5*d.* lb. In actual fact the first Springs sold by Moulton later in the year were priced at 1*s.* 6*d.* lb. To have sold them below 11*d.* lb. (minimum unit costs) would not have even covered money 'out of pocket'. The extent to which he could sell his goods above this figure in order to allow for the anticipated profit margin on the average product was dependent on the limits of market strategy, which in this instance are not known.

Although the practice of preparing a cost analysis of a short-run production period, or a trial batch, was common to these early companies, the Manchester and Edinburgh Houses (much more than the Bradford House) were prepared to add a fixed allowance for indirect costs (or what all three houses, at one time or another, termed 'Expenses', or 'Standing Expenses') as is done below:[2]

July 19th, 1849.

Cost of 538 Vulcanized Shoes.

lbs.	£	*s.*	*d.*	£	*s.*	*d.*
121 10 oz. Spread Rubber @ 3/-	18	5	0			
105 0 oz. Stationers' „ @ 2/-	10	10	0			
52 8 oz. Currugated „ @ 1/-	2	12	6			
				31	7	6
20 lbs. of Varnish @ 1/-				1	0	0
1 Gallon of Naptha @ 2/-					2	0
Wages paid				5	7	0
36 yrds of Cotton Check 48 yrds of Woollen Check				3	12	0
39 lbs. 3 oz. of leather @ 1/6*d.*				2	18	9
				44	7	3
20% for Expenses				8	17	6
				£53	4	9

How the early rubber manufacturer gauged his position in the case of a commodity already on the market, and for which the price was known, is clear from the example given below where an attempt has been made

[1] As Moulton's discounts were much below this figure it is difficult to understand why he made such an allowance, unless he included with the discount his selling charges. It is worth adding here perhaps that in his 'Stock A/c' for the years 1850–4 the manufacturer made a similar discount allowance (30 per cent.) against stocks of manufactured goods. From 1855 onwards stocks of manufactured goods were entered as 'Nett'.

[2] Moulton Papers.

by the Manchester House (still on the average cost basis) not only to estimate the cost of a pair of rubber shoes but also to discover the profit per pair:[1]

Estimated Cost of a pair of rubber Shoes.

Aug. 27. 1849.

	d.	
Rubber and Varnish	24·1	
Check lining	2·0	
Leather	3·0	
Wages	5·0	
	34·1	
Expenses 20% incl. Rent, Heating & Lighting, Overlooking, Lasts &c. and Royalty:	6·9	
	41·0	per pair average.
	d.	
Average Price	63·0	
20%[2]	12·6	
	50·4	
Charges 10%[2]	5·08	
	45·32	
	41·00	cost
	4·32	Profit per pair.

In these calculations the manufacturer appears to have been concerned primarily with the average cost and the supposed average gain or loss on one product—whether it was a pound of Spring Rubber or a pair of shoes,

[1] Macintosh Papers. Several years later, on 24 Mar. 1853, the Manchester House prepared an estimate of the direct costs for a New Material Composition for Rubber Over-Shoes along slightly different lines:

			s.	d.
8 lbs	Pickled Rubber Bottles	@ 17*d.*	11	4
6 „	Zinc	@ 3*d.*	1	6
6 „	Whiting	@ ½*d.*		3
1 „	Sulphur	@ 1½*d.*		1½
3 „	Lamp Black—uncalcined	@ 1½*d.*		4½
			13	7
	Mixing & Spreading will cost 3*d.* lb		6	0
			19	7×12

= 235*d.*, divided by 24 (no. of lbs) = 10*d.* lb.

[2] It is reasonable to assume from other examples that the 20 per cent. and 10 per cent. deducted from the average price are liberal allowances for discounts and selling costs respectively.

average unit costs being regarded as constant for different levels of output. This method might not have been precise, but it was at least simple and straightforward, and it told him what he certainly appears to have been concerned to find out: the gross profit margin on the average product.

As far as the Bradford Mill was concerned the true trading position was only revealed with the casting of the half-yearly 'Working of the Factory' account which was compiled in June and December of each year:[1]

Working of the factory to June 30, 1858.

Dr.	£	*s.*	*d.*		£	*s.*	*Cr.* *d.*
For India rubber . . .	1631	11	1	Goods Sold 1st Jan. to 30th June, 1858 . . .	6803	14	2
Cloths & Duck . .	1068	11	6				
Chemicals . . .	350	6	4	Nett increase in Stock, 30th June	583	0	0
Sundries . . .	151	7	6				
Iron Castings &c. . .	25	3	9				
Coals	112	16	4				
Iron, Iron Wire & Iron pipes . . .	152	17	2				
Paint, solder & lead .	29	15	9				
Boards for packing cases	44	19	3				
Insurance . . .	70	7	6				
Carriers a/c . . .	96	3	8				
Rates & Taxes . .	122	14	10				
Commission to Clayton .	18	18	9				
Rent of London Office .	60	0	0				
Interest paid. . .	226	10	8				
Wages	1194	12	6				
Salaries . . .	368	0	0				
London. Petty Expenses, Discounts & Deficiencies	80	16	2				
Alld. for damaged goods returned & cash discounts . . .	89	7	11				
Gas for six months .	38	14	6				
Expended to produce £7386. 14. 2	£5933	15	2				
Nett Profit, as per Ledger .	1452	19	0				
	£7386	14	2	Goods produced . . .	£7386	14	2

This document is interesting not only for the analysis of expenditure and the rate of profit enjoyed by the business, but also for the postscript which follows it:

Remarks on the Factory *Expenditure* for the six months ending 30 June.
Out of the Expenditure of £5933 only £3050 or about *one-half* was incurred for the expense of Rubber, Cloths & Chemicals, almost exactly *one fifth* of the whole

[1] Moulton Papers.

expense was for Wages, *one sixteenth* for Salaries, *one twentieth* for Interest of Money paid[1]

Altogether the cost of production may be taken thus:

	s.
One half, Rubber and other materials, say	1/-
One half, Mill Expenses . . .	1/-
Cost, Money out of Pocket . .	2/-

by which it is intended to be conveyed the idea that to know the actual cost *out of pocket* the amount for materials must be doubled.

It will be noticed that in arriving at his net profit the manufacturer neither made an allowance for the rent of the mills used by the company nor for depreciation of machinery; he regarded both these assets—mills and machinery—as his own private property. In valuing his net increase in stock at existing market prices he followed a practice which did not meet with the approval of the merchants who, at an earlier date, had financed him.

In contrast to the rule-of-thumb practices of the small manufacturer, a large establishment like the North British Company was able to assess the position of its different manufacturing departments by means of a detailed fortnightly 'Statement of Consumption and Output':[2]

It is true that the cost figures in this instance do not represent total costs (and from discussion at board meetings these statistics played no part in pricing policy), but they did provide a fairly efficient guide to the progress of the different departments. Of greatest importance to the directors was the fact that these returns threw light on the Special Labour charges of each department.

[1] The evidence of these early papers (Moulton, Macintosh, and the North British) is that the rate of net profit earned on sales was sufficiently extensive to make the changes in the rate of interest of little importance in the policy making decisions of these companies. One example must suffice here. After submitting a detailed estimate of the probable outlay in plant required to begin an elastic web weaving department the Secretary of the North British Company in his report to the Meeting of Directors on 12 Apr. 1865, concluded: 'Or say for an outlay of £800–850 we could produce 250 yards per loom per week or 3000 yards in all, which at 3/- per yard would amount to say £450, or say the net monthly production would be £1500.' On 27 Jan. 1866 the manager reported 'that after a careful estimate of the Elastic Fabric Department up to the end of last year he had found it yielded a net profit of about 12½% on the sales . . .' which at an approximate figure of £1,500 per month = £18,000 a year at 12½ per cent. = £2,250, i.e. about three times the original capital outlay. (Source: Minute of Meeting of Directors of the North British Rubber Co. Ltd. for these dates.) The estimated rate of profit on sales was the determining factor in capital outlay in this industry and not the movement of interest rates.

[2] Extract from the Minute of Meeting of Directors of the North British Rubber Company Limited, held on 29 Aug. 1864. The Manchester House appears to have ascertained the relative expenses of buying, manufacturing, and marketing a product by costing summaries.

Summary of Cost of Washers—March 17/1851

Material 14*d.* (incl. rubber & chemicals).
Making 7½*d.* (incl. labour as well as indirect standing expenses 8½*d.* calculated as 20% of direct costs).
Sales Expenses (incl. an allowance for discounts) 2/6*d.* per lb.

Statistics for Fortnight ending 10th August, 1864

	£	s.	d.	£	s.	d.
Shoe Department						
Rubber used 9804 lbs.	770	0	2			
Mixtures	95	0	10			
Textile Fabrics	720	14	6			
Special Labour	346	4	0			
				1931	19	6
Clothing & Air Goods						
Rubber 760 lbs.	61	8	8			
Mixtures	5	16	4			
Fabrics	148	16	1			
Special Labour	37	1	3			
				253	2	4
Mechanical Rubber						
Rubber 12989 lbs.	1050	3	2			
Mixtures	82	2	3			
Fabrics	538	3	3			
Special Labour	195	17	1			
				1866	5	9

Productions:

44037	Pairs Boots & Shoes various kinds.	844	Bags & Air Goods articles.
		12183	lbs Packing.
445	Garments various kinds.	19141	feet Belting.
400½	Piece Goods.	11335	feet Hose.

IV

So far the examples have been concerned with the costing of goods being manufactured. What follows is an extract from a report prepared by Stephen Moulton in an attempt to forecast the annual costs and profits of the London India Rubber Company Limited—of which he was the Managing Director—formed in 1860; it is considered of sufficient historical importance to warrant its being quoted in full:[1]

Plan No. 1.

Assume that, though we can make much more, we sell for some time only 6 tons per week, and that the 'No. 3.' rubber on which we get least profit and which is in demand at 9¼*d.* per lb.
To make 6 Tons—120 cwts.

	£	s.	d.
60 cwt. Old Rubber @ 20/-	60	0	0
7½ „ Caoutchouc, say @ 150/-	56	5	0
52½ „ Composition averaging 12/6*d.*	32	16	3
6 Tons Coals @ 13/0*d.*	3	18	0
Cartage up and down	2	8	0
Incidental expenses of all kinds	4	12	9
Wages, say (including bookkeeper)	28	0	0
	188	0	0
Add 1 weeks Standing Expenses[2]	120	0	0
	£308	0	0

[1] Moulton Papers, 10 Jan. 1860.
[2] These Standing Expenses are given opposite (see footnote † on p. 51).

There is considerable waste on manufacture of foreign matter to an amount at present unascertained, but which may be considered well covered by assuming that the Ton of Raw Material of 2240 lbs. is reduced to one of 2000 lbs. manufactured rubber, to sell at 9½*d.* per lb. By the above calculation every pound of such a Ton costs nearly 6½*d.* (out of which 3½*d.* cost of material and manufacture) and, at 9½*d.* gives 3*d.* profit.

	£	*s.*	*d.*
6 Tons 'No. 3' @ 9½*d.* nett sell for	463	10	0
Deduct Cost	308	0	0
	154	10	0
On a year of 50 wks. that makes clear profit	7725	0	0
Deduct 12½ per cent on Sinking Fund	965	12	6
	£6759	7	6

At the rate of dividend this will give

	£	*s.*	*d.*			
Directors take another	250	0	0			
and Manager	500	0	0			
				750	0	0
Leaving available for dividend				6009	7	6

which gives nearly 12½%

V

Many interesting points arise from a study of this document: as from the other forecasts given below, which were prepared at the same time and must be read in conjunction with it.[1] For instance the manner in which the manufacturer made his calculations on the basis of existing prices; the emphasis placed on output; the allowance for reserve capacity; the addition of Standing Expenses; and the plan to produce either the whole of one or parts of two or more kinds of rubber according to the needs of the market.

† *Standing Expenses*

	£
Rent of Factory	500
Rent of Warehouse	300
Rates, Taxes and Insurances	200
Directors	500
Managing Director	800
Manufacturing Manager	500
Secretary, Clerks, Warehouseman & Porters	800
Percentages to Travellers & Agents	600
Stationery, Incidents & Bad debts	500
Depreciation in Value of Plant & bldgs.	1,000
	£6,000

Say £120 per week, £20 per day, or on a weekly production of 6 tons: 2½*d.* per lb.

[1] Plans Nos. 2, 3, and 4 are given on p. 52.

Whilst the practice of adding a costing margin for indirect expenses (as these papers illustrate) was common to these early companies, neither the adding of a costing margin nor the intention to secure a certain profit on

Plan No. 2.

To make 6 Tons (120 cwt.) 'No. 2' Selling price 1/3*d.* nett.

	£	*s.*	*d.*
65½ cwt. Old Rubber @ 20/-	65	10	0
11 „ Caoutchouc @ 150/-	82	10	0
43½ „ Composition @ 12/-	26	2	0
6 Tons Coals @ 13/-	3	18	0
Cartage up and down	2	8	0
Incidentals, say	4	12	0
Wages, including bookkeeper, say	25	0	0
	210	0	0
Add weeks Standing Expenses	120	0	0
	£330	0	0

By this calculation a pound costs a fraction over 6½*d.* of which 4*d.* material, power and labour, and gives 8½*d.* profit.

	£	*s.*	*d.*
6 Tons 'No. 2' at 1/3*d.* nett sell for	750	0	0
Deduct Cost	330	0	0
	£420	0	0

On a year of 50 weeks that makes clear profit £21,000.

Plan No. 3.

Assume that we can sell 6 Tons a week and not more in equal quantities of Nos. 2 & 3. The year's profit will be:

	£	*s.*	*d.*	£	*s.*	*d.*
Half of £7725:	3862	10	0			
& of £21000:	10500	0	0			
				14362	10	0
Deduct 12½ per cent as Sinking Fund				1795	6	3
				£12567	3	9
At the rate of dividend this will give, Directors and Manager will take another £500				1000	0	0
Leaving available for dividend				£11567	3	9

Which gives nearly 24 per cent.

Plan No. 4.

If we assume that we sell but 6 Tons a week, one third No. 2, one third No. 3, one third floor cloth about same cost as No. 3, and not yielding a larger profit—one year's profit will be:

	£	*s.*	*d.*
2/3rds of £7725: £5150			
1/3rd of £21000: £7000			
	12150	0	0
Deduct 12½ per cent Sinking Fund	1518	15	0
	10631	5	0
At the rate of dividend this will give, Directors and Manager each take another £500. 0. 0.	1000	0	0
Which gives nearly 20%	£9631	5	0

sales[1] were independent of market activity. The manufacturer was well aware of the changing position of the market, yet to take but one example —say the circumstances surrounding the declining fortunes of the Bradford business in the sixties—it is clear that in spite of the increasingly competitive conditions of the market (caused in particular by the appearance of the North British Company) the focal point of the manufacturer's interest was not competitors' prices but the elements of his own manufacturing costs. The manufacturer was never tired of reiterating to his correspondents that price was an extension of costs and that any change in price without a prior change in costs (primarily in the cost of crude rubber) was asking for trouble. Similarly, the most convincing demands for price reductions made by the dealers were those based on evidence of falling costs. Replying to such a demand in 1860 Moulton wrote:

S.M. to Spencer & Co. 17/12/1860:

In answer to your letter of the 15th inst., I am equally interested with you on the proper adjustment of the price of our Goods, and I am attentively watching the market for the raw materials. The *actual* fall has been on Para 4d to 6d per lb, on Java only 2d or 3d—the stock of the latter *very* small indeed. I do not know of any Lot in London at present. Purchases, *for arrival*, are speculations, and consequently not a proper basis upon which to reduce, or raise, the price of Manufactured Goods.

I think, on reflection, from the prices of the raw material I have above quoted, you will see that the *actual* decline (especially in Java of which we use the greatest quantity) is as yet comparatively trifling, but should it return to its former price, or even tend towards it, I should of course in this case make a corresponding reduction.

I do not notice the reduction you quote as made *again* by Mac., my 10%s are not so many as to bear such repetitions. If you will favor me with a little consideration, comparing my Goods, and prices, with those of any of my competitors, and also consider the present *actual* fall in the raw gum, (throwing aside the high price of the gum on hand and which ought not to be overlooked) I trust you will be satisfied that I cannot as yet in justice to myself make any reduction in our Lists to you, and the rest of my customers.

Assuring you that I am fully sensible of the impolicy of high charges.

I am &c.

[1] Moulton did not measure the progress of his business according to the return on capital but as a profit margin on sales; as did the larger companies, e.g.: 'The Directors in submitting the Balance Sheet of the Coy. for the past year, with the auditors report thereon have to express their disappointment at the result of the year's trade. The Net Profit of £12,285 upon Sales amounting to £180,000 is a return less than might have been reasonably expected. . . .' (Extract from the Minute of Meeting of Directors, the North British Rubber Company, 29 Jan. 1867.) And again: 'The Manager submitted the question of advance in prices of manufactured goods, stating that we were, owing to the present enhanced cost of materials entering into our manufactures, working at a reduced rate of profit. After full discussion it was decided that the Company should issue new price lists for all goods, based on present cost of materials and labour, treating the prices therein to such discounts as should leave a profit on sales not less than 18%.' (Extract from the Minute of Meeting of Directors, the North British Company, 4 July 1872.) It is worth noting, however, that when Moulton was estimating the future profitability of the London India Rubber Company he was concerned with the return on capital.

As with Moulton so with the larger North British Company:

> The state of the rubber market was then considered and in view of the very high prices being paid for raw material, the meeting unanimously resolved to advance the prices of manufactured goods, and instructed the Manager accordingly, leaving the details to be carried out by him.[1]

That Macintosh or the North British should have decided upon a change in their prices was not surprising to Moulton; that they should do so without any previous change in the cost of raw materials was regarded by him as little short of unfair practice. And (dealing with price reductions) in 1861 Moulton had to confess[2] that as 'The price of rubber remains the same . . .' he could not understand the reductions made by the other companies.

VI

It might be well to remark here that it was not so much the number of contestants that sharpened the struggle for markets as the circumstances under which the goods were produced and marketed. As regards production, once the vulcanization process had been generally adopted there were no radical changes in technique to give any manufacturer an advantage in costs. Moreover there is no evidence in the early days of this industry, certainly not as regards rubber mechanicals, that the larger were able to undercut the smaller firms because of the economies of scale. It is reasonable to think that the larger houses must have enjoyed some advantages of size, but if economies of scale enabled the Macintosh and North British companies to produce a wider range of qualities at lower prices it was a fact never stressed either by the manufacturer or his agents in the field. As for marketing, by the fifties the manufactured article, as with the raw material, was bought and sold in a well-informed market;

[1] Extract Minute of Meeting of Directors of the North British Rubber Company, Limited, 9 Aug. 1871. The Moulton Papers show that customers not only kept an eye on the other manufacturers' prices but also on the movements of the crude rubber market. For instance, Spencers wrote to Bradford on 27 Feb. 1861: 'We *must* reduce our prices on 1st March. . . . I enclose an extract from the Board of Trade Returns, and the Comm. Record. E. Indian R. is coming in in large quantities and the market continues to fall . . .'; J. & A. Pumphrey, Birmingham, 1 Sept. 1864: '. . . by our own practical experience we know something of the cost of production . . .'; S.M./The Radstock Coal Coy. Bath, 30 May 1878: '. . . We are aware that there is a slight reduction in the price of best quality Rubber, which is entirely owing to the present depression in trade throughout the country, and consequently not to be depended upon . . .'; and lastly, F. Pearce & Co., Liverpool, 8 May 1884: '. . . When Para falls customers expect prices of mechanicals to fall, too. . . .' Moulton's price increases were invariably based (save for the period of the American Civil War when there was a great advance in the price of cloth) on the rise taking place in the raw rubber market. For instance, on 10 Oct. 1879 the following letter was sent to his customers: 'We regret to inform you that owing to the very excessive rise in the prices of Raw Rubber we will be compelled to raise our present prices in all qualities 2d per lb.' In announcing price advances the Manchester House always employed the same phrase: '. . . in consequence of the increased value of the raw material . . .'.

[2] S.M./Spencer & Co., London, 28 Aug. 1861.

and the absence of product differentiation, coupled with the relatively unimportant part played by transport costs, made price and the terms of sale the all-important factors for most consumers. In these circumstances either Moulton followed the price lead of the larger houses or his sales suffered the consequences:[1]

> You know that our effort has been to keep Macintosh's agents out of the market [wrote a Birmingham House in 1856] both as to quality and as much as possible as to price, tho in this we have failed as they reduced their washers in the same proportion as their buffers. If we cannot get your goods comfortably to ourselves we must sell out and replenish with Mac's goods which if not so satisfactory in some respects will be more profitable.

Moulton's dilemma, caught up as he was in the struggle between his two much larger rivals, is well brought out in the correspondence of the time:

> I dont know what the India Rubber trade is going to come to [wrote one of his agents from Gateshead in April, 1861] Macintosh have reduced their prices again. I apprehend it is with a view of trying to break up the Edinboro' Coy who are sending out a washer @ 1/6*d.* lb which looks well, and I hear is good and answers well. It appears that they (Mac & Co) are allowing 20% nett off to all Engineers, . . . which brings their goods lower than yours . . .[2]

And his London Manager replying in 1864 to a complaint from Bradford concerning the falling off in orders wrote:

> You must really not blame me for not getting orders. I can assure you I have tried very hard and will still do so, . . . but the fact is that there appears to be two Houses in the trade (Macintosh and the North British) who spare no expense in canvassing every person who has even only a single engine band moving, and they keep up a regular weekly visit. Several Houses I have been to tell me that I am the second, sometimes the third, who has been the same day upon the same errand.[3]

By 1868, although (according to the retained imports of crude rubber) total sales within the industry had increased, Stephen Moulton's share of the market (his prices still ranging above those of either Macintosh or North British) had declined, and he was faced with the necessity for the most stringent economy in the conduct of his business:

> The very great falling off in my business [he told his London Manager in 1868][4] with every prospect of its continuance and the desperate, I may call it, competition amongst the manufacturers in reducing prices below cost and charges, renders it imperative upon me to reduce expenses as much as possible. I have therefore resolved to give up our London establishment . . .

[1] J. & A. Pumphrey & Co. Birmingham/S.M. 1 Sept. 1856. One of the very few references to the advantages of large-scale business appears in Moulton's letter to Spencers (28 Aug. 1861): '. . . We can only say we dont think they [Mac. & Co.] have any advantage over us that can fairly justify this reduction. . . .'

[2] W. Clayton/S.M. 18 Apr. 1861.

[3] T. Goodwin/S.M. 7 Jan. 1864 and 26 July 1864: 'I fear we shall not stand much chance of the East India Railway Contract as there are a great number after it, and "all as hungry as wolves".'

[4] S.M./T. Goodwin, 13 Apr. 1868.

This letter is important because like others written in the same vein it throws light on the manufacturer's pricing policy. The essential point is that when Moulton felt the squeeze of his larger competitors he did not turn to prices (at least not immediately) but costs; particularly to the reduction of those overhead costs (as when he closed his London sales establishment in 1868) which would leave his manufacturing capacity unimpaired. And to those who complained of his relatively high prices his answer was invariably the same: 'that a good article in rubber cannot be made at a low price . . .',[1] and that whilst trying to 'keep to the general level of the market' he did not 'profess to compete in price with every kind of trash that is made by other parties . . .'.[2]

For Moulton to try to beat his competitors at price cutting (as he had done at the outset when the Macintosh Company was enjoying wide gross profit margins), quite apart from being in his eyes (without corresponding reductions having already been felt from the market for raw materials) an unfair practice, could only worsen his general position; particularly if in cheapening his goods he jeopardized the high-quality market in rubber mechanicals he had striven to establish. The North British Company, as a price leader, could afford to forgo profits to drive the invading Frenchmen out of the London rubber shoe market;[3] Moulton could not do so. As long as he was unable to seek refuge in product differentiation or the Patent Law price changes were to be justified only on grounds of changing costs. To make a price concession regardless of costs was fundamentally unsound: 'There is one satisfaction in declining competition [he wrote to a customer in August 1861][4] and that is you leave your competitor in the

[1] S.M./Spencers, London, 3 Sept. 1861. 'We cannot see the reason for Mac's reduction of 3*d.* per lb [Moulton wrote] unless they mean, at the same time to reduce the quality in proportion. The specimen of bad, I should say fraudulent, Rubber you lately sent to us is something like proof that a good article in rubber cannot be made at a low price, and of which we have been long since convinced by our own experience. Whatever we may do, at any time, we are fully determined to maintain the quality of our goods, which will sustain the reputation of the rubber manufacturer. . . .' Though it took many years for certain branches of the trade to appreciate this policy: 'Engineers are beginning to know [wrote J. Syme from Glasgow on 9 Apr. 1870] that low priced valves are the dearest. . . .'

[2] S.M./J. A. Eaton, 13 June 1868. 'The stand we take in the trade [Moulton wrote] is that we are the oldest manufacturers of properly cured Rubber in this country and that our Rubber is the best cured of the various kinds which are made and will best stand high steam heat &c, but although we keep to the general level of the market we dont profess to compete in price with every kind of trash that is made by other parties. . . .'

[3] Extract from a Minute of Meeting of Directors of the North British Company Limited on 8 Aug. 1866: 'A full discussion then took place upon the proposal to meet any cheap shoe that might be brought out in the London market . . . it was unanimously agreed that if the French or any other Company attempted to sell a cheap shoe which in the opinion of Mr. McLaren was to damage us, that he should offer a shoe of our own make (without our name) at such prices as he might find necessary to prevent such damage in future.'

[4] S.M./Spencers, 28 Aug. 1861. A few weeks earlier (23 July 1861) George Spencer had warned Moulton: '. . . I shall not again urge you for a reduction, and by our not refusing the new price do not imagine we are satisfied. You are not aware of the opposition and competition we have to contend agst. Coleman's Patent only gives us a profit of 1½d. per

enjoyment of a profitless business . . .', which meant the loss of customers, of course, but for Moulton kept the core of his business sound. Far better as he saw it to try to maintain his established price and surrender part of the market; and at the same time cut down his standing expenses. There was always a group of customers—even when his prices were well

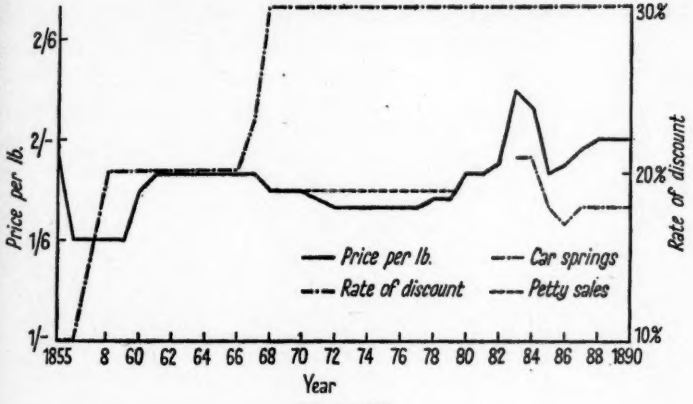

CHART C.[1]

above the general level of the market—who either from conservatism or because they balanced quality with price, continued to do business with him;[2] and where engineering products were concerned dealers could not

lb at your present prices. Our profit on the cones varies—our principle is to accept orders if we can only get 5% profit. . . . Mac have given us special terms. . . . Having the command of capital I shall not be satisfied until I find a cheaper market. . . .'

[1] Chart C (drawn to illustrate price and discount trends) needs to be studied in conjunction with Charts A and B. The price line is based on a quarterly average of the selling price to five of Moulton's largest customers, namely, the G.W. Railway, the Ebbw Vale Ironworks, G. Spencer & Co., Mechanical Engineers, Pumphrey & Co., a Birmingham wholesaler, and the Bristol & Exeter Railway. The Petty Sales curve for Springs and Rings (which except for the seventies follows the course of the general price line throughout) has been charted because it illustrates an interesting aspect of sales policy. When prices were at a low ebb in the seventies Moulton discriminated against small orders by charging a slightly higher price, yet when the price per pound of Springs and Rings rose again in the eighties the practice was discontinued. The price movements of American Car Springs—manufactured from a cheaper composition for the American market, and charted only for the years of most violent price changes—illustrates the tendency for the prices of different quality products to move together.

[2] Had this not been so, Moulton would have been crushed out of the market in the struggle between the North British and Macintosh. The net prices for best quality rubber (allowing for the trade discount) of the leading manufacturers in Dec. 1860 was as follows:

Macintosh & Co. . . .	3*s.* 1*d.* lb.
Hooper & Co. . . .	3*s.* 4½*d.* lb.
Silver & Co. . . .	3*s.* 9*d.* lb.
Moulton & Co. . . .	4*s.* 5*d.* lb.

Source: W. Clayton/S.M. 14 Dec. 1860. On 26 Apr. 1861 the same writer gave Macintosh's price as '3/7*d.*, 20% off., your price is 3/3*d.* nett or 2½% off for cash'.

remove their moulds from the Bradford Mill with every change in price.[1] And yet, it needs to be remembered (as in part the accompanying charts show) that it was one thing for the Bradford manufacturer to declare his allegiance to a costing and pricing procedure—to denounce those who, selling their goods 'below costs and charges', brought distress to the trade—and another thing, as the price and discount concessions of the time reveal, to adhere to it and survive.

VII

Two further points remain to be dealt with. The first concerns the Terms of Sale, the other point concerns the movement towards price regulation in the closing years of the century.

As regards the Terms of Sale, a change in published mill prices normally affected all consumers, but in the adjustment of the rates of trade discount—published and secret[2]—the manufacturer could avoid general price concessions, and might hope to retain or increase his share of a particular section of the market. It is in this respect that any analysis of the price structure alone in this industry is an insufficient explanation of changing market conditions.

The normal terms allowed by Moulton at the outset were Nett, 3 months bill; 2½ per cent. for cash. The cash discount (together with the standard trade discount of 10 per cent.) was given on monthly accounts, and by the eighties the monthly account, settled by cheque rather than by bill, predominated.[3] But there were many exceptions to these so-called standard rates, the chief criterion determining the manufacturer's action being one of expediency.[4] Indeed, the manufacturer's discount policy reflects most

[1] Spencer/S.M. 2 Sept. 1861: 'If we are compelled to move the greater part of our moulds we shall not be able to remove them again from Mac & Co. . . .'

[2] It was Moulton's practice—as indeed it was the practice of his rivals—to give special secret rebates to favoured customers: '. . . entirely masonic' as one correspondent described them. His London Manager writing in 1864 (22 Jan.) told Moulton: 'My impression is that the large consumers are receiving a heavy discount off the published prices of your competitors from hints dropped. . . .' Alas, these arrangements did not always run smoothly. As the vigilant Brown, Marshall & Co. of Birmingham wrote to Bradford on 21 Aug. 1856: 'Sauce for the goose should be also sauce for the gander, and why we should pay 2/- at the time you are charging other parties 1/11 with 2*d*. less for Commn for the very same things we cannot divine. . . .'

[3] S.M./Fordred & Atkin, London, 20 Aug. 1861: '. . . Although we should be happy to extend our Business in garments, or any other branch as much as possible, yet we are not desirous of doing so on credit, especially long credit, the extent of credit allowed by us not exceeding 3 mths., and even then we at all times give the preference to cash business. . . .'

[4] Braithwaites/S.M. 16 June 1857. When, for instance, in June 1851 Moulton's London Agent wrote: 'The more I think of our customers and other retailers being allowed 10% discount off your Mill prices the more I am convinced of the ruinous injury it must inflict upon me and my brothers who with myself incurred serious expenses to enable you to weather a storm . . .', they were silenced by having their own discount raised from 10 to 15 per cent.

clearly his attempts to assess the competitive element in different parts of the market for rubber products. And the manner in which discount rates grew throughout this period from the 10–20 per cent. of the fifties to the 30 per cent. of the seventies (where they appear to have stabilized, vide Chart C) throws an interesting light on the degree of competition met with. As far as the Moulton Papers are concerned there can be no doubt that it was not the small- or medium-sized manufacturer but the larger firms who were responsible for this upward trend.[1]

By 1860, as a result of the doubling of trade discounts by the two largest manufacturers in the trade—the Macintosh and Edinburgh Houses—a correspondent writing to Bradford[2] could 'take it for granted that *all* your goods are subject to 20% and 2½% monthly accounts', and in 1864 Moulton's London Manager informed him[3] 'that the North British Company have travellers and agents in every part and principal town of Great Britain, and will allow 25% on even 5/- worth of goods'. Just over a decade later in 1877 a London customer told Moulton that 'No other firm has waited to be asked for a discount of 33⅓rd',[4] but by this time the movement which had raised discounts from the normal 10–20 per cent. in the fifties to the 30 per cent. of the seventies had almost spent itself, and in the case of the Bradford Mill only rarely were the largest customers allowed a discount as high as 35 per cent. which was first given in 1879.[5]

The second and last point concerns the movement towards price regulation in the closing years of the century. Unremunerative business, encroachment in the home market by the foreigner, the uncertainty of the

[1] J. Cooper/S.M. 18 May 1857. 'I had a long talk with our old friend Walmsley of Bolton [wrote Moulton's traveller]. He is very well disposed towards you and would be glad to buy if you could match the enclosed [Mac's] 2/2*d.* per lb., *20%* discount.' And referring to another Lancashire company 'who buy all their hose from Mac' the traveller commented that they had no fault to find with the Bradford products 'but get a larger discount, about 10% more'. In Dec. 1860 Macintosh doubled his discount (from 10 to 20 per cent.) on 'A' quality India-rubber and in Feb. 1861 (1 Feb. 1861) Moulton's agent on the NE. coast (W. Clayton) told him that the prejudice was in favour of Mac & Co. 'by them allowing full Trade discount to consumers which militates against any other House . . .'. On 8 Apr. 1864 Burrows & Carmichael, Engineers, Banbury, wrote to Bradford: '. . . We are offered higher discounts by two of the first houses in the trade. We have done business very pleasantly with you but will return the order unless terms are more . . .'. Which meant an increase in the trade discount to this house of 5 per cent., from 20 to 25 per cent. And in the seventies Moulton secured many orders only by matching the discounts offered by his competitors.

[2] Bakewell, Crawley & Co., London, 17 Feb. 1860.

[3] W. Goodwin/S.M. 10 Apr. 1866. On 7 Nov. 1860 Spencers had reported that 'The North British Co. are doing us harm in certain quarters, and their prices all under ours', and on 30 Mar. 1863 G. P. Dodge & Co., of London, confirmed the generally accepted opinion in the trade that 'The North British Co. are forcing the pace on prices'. Twelve years later on 2 Jan. 1875 W. Clayton of Gateshead wrote that 'The North British Co. are indefatiguable to sell their goods . . .'.

[4] W. Rogers & Co. London, 10 Aug. 1877.

[5] It is hoped to publish a more detailed study of Moulton's Sales Ledgers, 1853–91, in due course.

supply of raw rubber, and the lowering of standards resulting from price warfare, encouraged this development. On the other hand, while manufacturers were neither too numerous nor too scattered to exclude agreement between them, the traditionally secretive and competitive nature of the industry kept it divided against itself on price regulation. In any case:

> Not by these paltry devices [wrote the *Trade Journal* in 1887][1] did the pioneers of the Rubber trade rise to their proud position amongst British Rubber manufacturers. . . . By ceaselessly striving after excellence, and allowing prices to be regulated by natural laws, by neglecting no opportunity for pushing goods in the markets of the world, and by continuous and bold advertisement are the triumphs of trade realised.

Besides, the instability of prices arose in part from foreign competition over which the British manufacturer had no control; and there was the problem of issuing uniform price lists for goods whose quality might differ so greatly.

Whatever the difficulties barring the way towards concerted action, the industry found itself drawn irresistibly towards it. It only took a further decade for the *India Rubber Journal* to suggest (and here was the thin end of the wedge) that competition should be abolished in the cheap and retained in the higher grade goods:[2]

> The greatest competition, the sorest and most annoying of all lies, or nearly all, in the very cheap goods and in the race to be in at the lowest . . . let there be free competition in the higher grade goods. We do not wish to interfere with enterprise or liberty, but let there be a strong boycott upon the manufacturer who sells below a certain figure in any article. . . .

And in 1898 the first Rubber Manufacturers Association of Great Britain was formed in Manchester.[3] The interesting feature of this conference was that the oldest firms (such as Moultons and the North British) refused to have anything to do with it,[4] but there were many less well established houses who found the running hard and to whom self-preservation was the most compelling argument for uniform price policy within the trade.

[1] *India Rubber Journal*, 8 July 1877. The Moulton Papers contains but one reference to price manipulation by concerted action of the manufacturers: Bunn, London/S.M. 2 Aug. 1854: 'I suppose that it would be useless (could it be brought about) for you, Silver and McIntosh to pull together and lower the market, or can you work together and raise the prices of the manufactured articles?'

[2] Ibid. 13 May 1898.

[3] Ibid. 4 Mar. 1898, at a conference of seventeen firms at the Albion Hotel, Manchester, on 10 Feb. 1898.

[4] *India Rubber World*, 1 May 1900: '. . . First thing that strikes one about the list of members of the Rubber Manufacturers Assoc. of Great Britain is the absence of names of some of the largest firms such as Warnes, The Silvertown Co., North British, and Spencer, Moulton & Co.'

VIII

A study of the Moulton Papers (as for those of other early companies) permits one to suggest certain tentative conclusions.

Firstly, as regards price determination. Save at the outset when the merchants tested the market for him (and then allowed the manufacturer to adjust his costs to what they thought the market would bear) Moulton's price was determined on the average cost of a single batch or a day's working. The paramount factor in his pricing procedure was his adherence to the average cost principle, and it is interesting that he should have been prepared to work his plant in the long as well as the short run on an average cost basis. He could hardly have believed that the average costs of supplies and the finished products would remain the same over a period —for the price of crude rubber was constantly shifting—but the costing margin (the percentage added to direct costs for 'Standing Expenses') and the anticipated profit return on sales were thought to be large enough to allow for any marginal changes.

Fundamentally, Moulton behaved as if his marginal and average costs were identical. A false assumption on his part, perhaps, but not sufficiently inaccurate to warrant the preparation of special cost data; which for the small manufacturer would have been difficult to obtain and of little practical value. As long as price covered direct and indirect costs (Moulton's 'costs and charges'), plus a profit margin on sales (not for all products or for all circumstances the same profit margin; which would be to attribute to the manufacturer's calculations a greater degree of exactness and constancy than they actually possessed), he was happy to expand production to the point where plant and labour were fully employed; and in boom periods (by readapting his manufacturing organization) beyond that point.[1] In other words, for Moulton price was determined not so much by movement to and from a point of equilibrium in the scale of operations as by changes in the cost of raw materials; particularly movements in the crude rubber market that affected a great part of his total manufacturing costs. Over a period, and this point needs to be stressed, no other factor could so easily spell prosperity or disaster for the producer than changes in the value of his rubber stocks.[2] Alongside this, changes in unit costs dependent on variations in the scale of operations were of little consequence. When Moulton's profits declined, either through internal or external forces (internal in a less intensive use of his working capital, external

[1] A more detailed discussion of this point will be found in the author's wider study. It does need to be said here, however, that the small manufacturer possessed an extraordinary flexibility to readapt his manufacturing organization.

[2] One of the heaviest losses sustained by Moulton can be seen from the Bradford Stock A/c dated 1 Jan. 1856:

in the increased competition in the market for his products or because of changes in the costs of raw rubber), or perhaps from a combination of these factors, his immediate reaction was not to reduce prices but costs, particularly his overhead costs. He did not expect the market to be indifferent to his prices, but his attitude towards a market that would not yield a profit when his costs and prices had been reduced to a minimum was straightforward: abandon it, as he did in the case of rubber footwear.[1] Or if a product was 'light of profit', such as the easily constructed rubber hose, he produced only sufficient of the article to satisfy the needs of his chief customers.[2] It would be pedantic as well as inaccurate to suggest that either Moulton or the other companies always worked on the full-cost principle (there are too many instances of 'weak selling', particularly in the trade war of the sixties and the early seventies, for this to be so), but over a period either the price covered 'costs and charges' (as well as a reasonable degree of profit) or the manufacturer declined competition; especially where it involved out-of-pocket loss.[3] The phrase 'a reasonable

Recapitulation

Raw Materials in Mill Cost £2388 (incl. £492 Java).	
Java Rubber in London .	£1885
Moulds, Tools &c. . .	£961
Manufactured goods nett .	£3160
	£8394

Then follows: 'Note. The above Java Rubber is now depreciated in market value £1000 or thereabouts.' And the Directors of the North British Company, meeting on 29 Jan. 1867, noted that: '. . . The attention of Mr. Norris was early directed to the selling price of different articles of our manufacture which appeared to him at rates totally inadequate to meet the rise in price. The rise in the price of the Gum during the past year has been ascertained to be £20,000 more than if the Gum had been at a normal price. The result of the year's trade has unhappily confirmed these views; which the keen competition that exists with other companies rendered a sufficient advance exceedingly difficult to secure. . . .'

[1] Although, unlike certain other English pioneers, Moulton had foreseen the importance of the shoe trade, American competition, coupled with the restrictions of the Patent Law, soon caused him to abandon it. On this see the author's larger study.

[2] Replying to Mr. E. Samson, Vienna (30 Nov. 1863), Moulton wrote: '. . . Hose is the poorest paying article which we make and we would not care to do a larger business at lower prices. . . .'

[3] In this connexion an interesting point was raised by Professor Kahn, which, with his permission, I shall mention here. He suggested that instead of Moulton working on the full cost principle it might well be argued that he (Moulton) 'was really out to make the maximum possible profit but that he was inclined to decline trade which involved an actual out-of-pocket loss. Were not his calculations [Professor Kahn wrote] designed to suggest what line to concentrate on rather than what price to charge?'

No doubt some of these early calculations were designed to provide an answer to both questions: should the line be taken up, and, if so, at what price? In fact, on occasions, it would be difficult to say with certainty which object the manufacturer had in mind; particularly as it is not always easy to trace the immediate connexion between cost estimates and price-fixing decisions; though this uncertainty can hardly apply to a Cost Estimate such as the one given on p. 47 for a new composition of a product already being manufactured.

As regards the wider and more important question—the full cost principle—I have come to the conclusion, after close study of these papers, that the Bradford manufacturer regarded the full cost principle as the norm, and anything else as an undesirable exception. I am

degree of profit' has been employed because it is the term used by the manufacturer himself. The possibility of earning a 5 per cent. profit on an order in 1861 was 'working against the bone', as against his generally accepted 20 per cent. margin. And the 20–30 (and even 40) per cent. profits of the fifties were far removed from the 10–20 per cent. of the nineties, though in the light of the closing years of the century no less 'reasonable'.[1]

In any event, total profits of the firm over a period depended not only on the addition to costs of a profit margin, or variations in output, but also on windfall gains and losses arising out of price changes in the supply of crude rubber, and in the constituent elements of costs themselves, as for instance in the changing amounts allowed for depreciation of fixed equipment and other contingencies.[2]

perfectly willing to admit the imperfections of the evidence I have studied, and the exceptions to full cost working that will be found in the Moulton Papers (which at a later date may be used against me), as well as the force of the argument, made on *a priori* grounds, that this man might well have improved his position had he abandoned full cost working altogether. In spite of this I consider (as fairly as I can put it) that the conduct of the Bradford Company—its attitude to costs and long-term goodwill—justifies the conclusions I have drawn; which is not to say that I have discovered a principle of business conduct applicable outside the special circumstances of the early rubber industry.

[1] 'Reasonable', that is, from the manufacturer's point of view. At the Meeting of Shareholders of the North British Company on 29 Jan. 1866, for example: '. . . The weaving department for the manufacture of elastic fabric has shown a fair profit and it is the intention of the Directors to extend this branch of the works. . . .' Writing to Spencers on 3 Sept. 1861 on Macintosh's ability to undersell the Bradford House, Moulton wrote: '. . . If they [Macintosh & Co.] possess a large capital they have also a large expenditure, and in one way, or another, rely upon it they will have a good profit, i.e. a reasonable one. . . .' Some idea of the profitability of the Edinburgh and Bradford Houses can be gained from the following figures:

S. Moulton & Co. 1854–60

Moulton's letter to Jennings (29 July 1861) shows that for the period 1849–60 '. . . the whole business has made £20 p.c. . . .'.

	Sales	*Net profits*	*Capital*	*Profits expressed as % of:*	
				*Capital**	*Sales*
1854	£19,807 19 5 (1/5/54 to 30/12/54)	£6,369 19 3	£12,041 17 9	53	32
1855	£29,859 5 10	£8,383 9 10	£20,173 4 11	42	28
1856	£18,922 4 0	£4,678 6 3	£23,535 12 9	20	25
1857	£17,739 18 9	£3,353 18 9	£22,678 5 9	15	19
1858	£16,407 16 5	£4,309 2 5	£20,891 15 3	21	26
1859	£23,969 1 1	£4,839 18 11	£23,404 9 10	21	20
1860	£29,525 15 7	£3,869 15 8	£22,490 17 4	17	13

[*Cont. on p. 64*]

* Excluding bank overdrafts and trade credits.

[2] A process best summarized in a Minute of Directors of the North British Company on 8 Jan. 1862: 'The Meeting are of opinion that the deduction to be made annually from Machinery etc. is best made by the course hitherto followed by the Company, in place of taking any fixed per centage, the state and condition of the Machinery, etc., being annually considered by the Directors at the meeting to fix the Dividend.'

[*Footnote 1 cont. from p. 63*]

North British Rubber Co. Ltd. 1857–1871

	Sales	*Net profit*	*Dividends declared*	*Capital stock**	*Profits expressed as a % of:*	
					Capital employed	*Sales*
1857	NA	£28,049 15 9½	10%	£50,000	56	
1858	NA	£48,977 3 7	25%	£68,000	72	
1859	NA	£64,439 8 11	20%	£92,000	70	
1860	NA	£39,624 9 5	30%	£100,000	40	
1861	NA	£40,733 14 0	35%	£100,000	41	
1862	NA	£26,496 13 9	40%	£100,000	26	
1863	NA	£28,701 19 7	25%	£100,000	29	
1864	NA	£27,647 8 9	10%	£120,000	23	
1865	NA	£37,790 6 10	15%	£130,000	29	
1866	£180,000	£12,592 18 5	28%	£130,000	10	7
1867	NA	£32,782 16 5	9%	£143,000	23	
1868	NA	£40,000 0 0	25%	£143,000	28	
1869	£217,100	£34,478 0 0	25%	£143,000	24	16
1870	£219,300	£42,609 0 0	25%	£143,000	30	19
1871	£223,000	£43,237 12 0	28%	£143,000	30	19

* Excluding bank overdrafts and trade credits.

In 1865 the North British prospered while other rubber companies were languishing. Announcing the excellent results the directors pressed upon the shareholders: '. . . the firm belief that their future prospects depend largely upon the results of the Company's business not being made public. Within the past few weeks one of the Rubber Companies in London have determined to wind up, another Company on the Continent is in a weak state, and a third company who promised a most troublesome competition, has lately had trouble among its disappointed and dissatisfied shareholders. The latter company, might, however, take heart and prosecute with new energy their undertaking if they learn of our prosperity.' [Extract from the Minutes of Meeting of Shareholders, 29 Jan. 1866.] Speculative disaster (a constant threat to those purchasing large crude rubber stocks) overtook the company in the following year and in large part accounts for the poor trading results.

The only available figures for the Manchester Company, Chas. Macintosh & Co., are as follows:

	Net Profits
1831	£17,690
1832	£19,964
1835	£40,828
1836	£70,708
1839	£94,619
1847	£46,154
1853	£40,053
1854	£23,949
1856	£42,681
1857	£37,968
1860*	

	Sales
1846	£60,000
1852	£180,000
1860	£300,000

* On 2 June 1860 C. Daft (Macintosh's late Consulting Engineer) told Moulton: '. . . I have it as a fact that Mac. & Co. make over £50,000 profit in one year. . . .'

According to a note written by Cecil Birley (grandchild of T. H. Birley, founder member of Chas. Macintosh & Co.) dated 8 Aug. 1915, the pioneering firm in the U.K. had a very thin time in the first 12 years of its life: '. . . I know that the result of the first 12 years [i.e. from the early twenties to the early thirties] was *nothing*. The profits for some years were offset by losses in other years . . .' (Macintosh Papers).

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CYCLICAL AND AUTONOMOUS INDUCEMENTS TO INVEST

By T. WILSON

THE familiar academic distinction between endogenous and exogenous factors has been amply justified by the advances made possible by it in our understanding of the trade cycle. An expansion or contraction may be initiated by all kinds of random shocks, but the movement, once begun, will generate new forces of its own that will carry the economy farther along the path it has begun to follow. Although the amplitude, speed, and duration of a cyclical swing will depend upon the combined action of endogenous and exogenous forces, it is illuminating to try, as far as may be, to separate the two groups in order both to understand the cycle and to devise means of ensuring greater stability in economic life. The general distinction, it will be agreed, is a useful one, but it has become customary to take a further step and try to construct models in which the turning-points, as well as the cumulative movements, are explained by endogenous forces alone. Such constructions are justifiable at an early stage in the study of the cycle because they help to sharpen the analysis; in the nature of the case, they are much too artificial to provide anything like a fully realistic picture, but they need not be condemned on this ground—provided their limitations, which no one would explicitly deny, are not in practice allowed to recede too much into the background. The temptation to concentrate attention on the factors susceptible to neat mathematical treatment is unfortunately a strong one, and however much one may appreciate the undeniably impressive achievements of the model-makers, one must, I think, admit that the temptation has not always been successfully resisted. Moreover, a convention seems to have been established that special marks will be awarded to models in which the forces operating have been reduced to the smallest possible number consistent with perpetual fluctuation, with the result that, apart from the scanty treatment in much of the literature of the exogenous forces, the endogenous themselves have been sharply reduced in number. A clear example of the latter tendency is afforded by the treatment of induced investment, which has come to mean investment induced by the secondary expansion of output during the upswing of a cycle, although it is obvious enough that there are other features of the cumulative movement capable of inducing—or deterring—investment; with the induced category too small, the autonomous category has naturally tended to become too large—in those cases, at least, where the latter has been accorded any explicit treatment at all. As a first step, the simplicity of such models is helpful, but as we proceed, it becomes

necessary to change the rules and to try to assemble and analyse, if not all the forces capable of influencing the cycle, at least the 'strategic factors'.[1] Such factors are likely to be inconveniently large for the construction of stylized models. Some, moreover, will be mutually inconsistent, which need not imply that certain alternatives must be abandoned but rather that all cannot operate at the same time. And that, surely, is the conclusion one would expect to reach, repugnant though it may be to the mathematical school; for there is a marked degree of individuality in all cycles as well as much similarity between them.[2]

The object of the present article is not to construct a model, but rather to classify and analyse the strategic factors determining the level of investment. In doing so an attempt will still be made to separate the endogenous from the exogenous, and we shall begin with Induced Investment as defined by Professor Hicks in his *Contribution to the Theory of the Trade Cycle*. As we proceed with the study of endogenous inducements to invest it will become apparent that neither Innovations nor Long-Range Investment can be pushed relentlessly into the autonomous category because both are, in part, cyclically induced. The corollary seems to be that the distinction between the exogenous and the endogenous has been misplaced: it is impossible to classify different acts of investment in this way because investment is so often the result of mixed motives, and it is rather the motives themselves that should be divided into those created by cyclical developments and those with a more independent origin. A good deal of stress will also be laid on what will be called the Structural Effect—those much neglected changes in the composition of output that must be taken into account if the fluctuations in investment are to be described at all adequately.

Much of what follows may appear to be highly critical of some recent models of the trade cycle, but it is well to bear in mind that both the terminology and the choice of factors to be studied may depend upon the stage the investigation has reached. The procedure suitable for the construction of stylized models may not always be appropriate when we

[1] The expression is borrowed from the title of J. M. Clark's famous book: *Strategic Factors in Business Cycles*.

[2] 'Since the mid-1930s', writes Mr. Kaldor, '(and more particularly since the publication of Keynes' General Theory) theories of the trade cycle have shown a happy tendency towards convergence. Gone are the days when the student of economics was free to roam amid such varied and contradictory "explanations" of cyclical fluctuations as over-investment or under-consumption (not to speak of sun-spots and planetary aberrations), structural disproportionalities or the instability of credit' (*Economic Journal*, Dec. 1951, p. 833). It is true that a more orderly approach is now possible, and the credit must go in no small measure to Keynes's classification of the determinants of output, but Kaldor does not presumably mean that we can construct a model capable of explaining all the main features of every cycle. The desire for a uniform explanation is apparent enough in modern theory, but there is little reason to feel pleased with ourselves about this development.

attempt to bring together the strategic factors, but the changes that have to be made need imply no fundamental criticism of the models themselves. The models are admirable in their place, and we have simply moved on to a new stage, a little nearer to the complex reality that is the ultimate object of our investigation.

Investment induced by demand

Professor Hicks defines Induced Investment as investment made in response to changes in saleable output measured in real terms. Or, to put it differently, such investment is induced by increases in demand reckoned at constant prices. We shall venture subsequently to modify this definition, but for the moment it is convenient to retain Professor Hicks's terminology. Let us now suppose that, for some reason which will be left unexplained, monetary outlay rises in an economy where there is a substantial amount of unemployment and an elastic supply of raw materials. We shall assume initially that tastes and techniques are constant and that, furthermore, wages, interest, and all other costs are unchanged and expected to remain so. Thus national expenditure has gone up, and with it the sales of the firm on which we are concentrating attention, but nothing else has changed. How will this development affect the volume of investment undertaken by the firm? At once it is necessary to assume something about expectations. If the new sales are expected to be only temporary and the firm is prepared to run down stocks—of which it may conceivably be carrying an abnormal amount—no change in output or investment may take place. If we now suppose that expectations are more sanguine, or are made so by the persistence of the higher demand, we are still left with a variety of possible assumptions about the elasticity of expectations. It is true that the theory of the multiplier assumes implicitly that production will increase in each period by the same amount as the increase in sales, but other reactions are possible and the elasticity of expectations may clearly have an effect on the nature of the upswing: such complications may well be of some practical importance, but, fortunately, they need not detain us now. Moreover, since we are not attempting to build a stylized model, it is unnecessary to assume that expected sales will be equal to those of the recent past—or indeed any fixed function of past sales; it will suffice to suppose that an appreciable increase in the volume of sales is now confidently expected. (We shall consider later the length of time the improvement is expected to last.)

As we begin our analysis of Induced Investment, we shall agree with Professor Hicks that 'it is a good rule in economic theory to stick to (the assumption of) constant returns until you have some reason for giving it up' (op. cit., p. 58 n.). But it must be made clear that by constant returns

we mean constant long-run average costs, not constant short-run average costs; the latter may vary appreciably as a plant is used more or less intensively. Constant returns, in the sense we have adopted, implies *inter alia* a constant ratio (v) between the size of the most appropriate capital stock (K) and the volume of output (O); this ratio will be termed the *capital coefficient*. Suppose, now, that output is expected to rise from O in period I, when the capital stock is K_1, to $(1+a)O$ in period II. The warranted increase in capital will be:

$$v(1+a)O-vO = v.aO.$$

This corresponds to Hicks's preliminary formulation only, and some qualifications have to be made.[1] First, the term $v.aO$ represents the required increase in the stock of capital, not the flow of investment over time. It is true that no further adjustment is needed if, with an analysis proceeding in terms of 'periods', the time required to make the new capital is assumed to be exactly one period; $v.aO$ then represents the flow of new investment over the unit of time with which we are concerned. The length of this unit may be defined in various ways: the lag between the receipt of income and its expenditure is a familiar example, and another possible choice is the minimum length of time for which estimates of investment and output can be prepared—this second unit being chosen with an eye on statistical limitations rather than analytical subtleties. Suppose the unit to be 3 months, but suppose the Gestation Period[2] which must elapse before $v.aO$ can be added to the stock of capital to be not also 3 months but 2 years; the rate of investment is then one-eighth of $v.aO$.[3] There is a further complication to be noted at this point: once we allow for the possibility that the Gestation Period for new capital may exceed the minimum 'period' of the analysis, we must also allow for the possibility of unevenness in the flow of inputs devoted to the making of the new capital. For example, it used to be said that much more labour was required at a certain stage in the making of an aircraft than at other stages, and the same may be true of various types of capital. The importance of this complication is slightly enhanced by the fact that the warranted increase in the firms' capital ($v.aO$) will take a variety of forms—larger inventories, more tools and machinery of various kinds, extensions to buildings, and so on. Even if it were true that in each case the flow of inputs was even, differences in the length of the Gestation Periods for different types of capital might result in an uneven flow of inputs over the

[1] Cf. Hicks, op. cit., pp. 67 et seq. and pp. 75 et seq.

[2] The term comes, of course, from Professor Robertson's great pioneering work *A Study in Industrial Fluctuation*.

[3] Those who prefer to use differential equations will find a much more sophisticated treatment in Mr. R. M. Goodwin's analysis of the 'flexible accelerator' in 'Income, Employment and Public Policy', *Essays in Honour of Alvin Hansen*, chapter v.

time when the firm was raising its capital stock by *v.aO*. If we decide, however, to ignore this possibility and assume that expenditure on the new capital proceeds at a steady rate, we can then define the *acceleration coefficient*, α, as the ratio between a change in output and a change in investment over one period; the acceleration coefficient is the capital coefficient deflated by the number of periods required to make the new capital.

The next complication is a familiar one. The formulation given above was based on the assumption that the capital stock in the first period was the one most appropriate to the initial volume of output, but it may well exceed or fall short of this amount, and the warranted increase in capital will not then be *v.aO*. The relationship between a change in output and the investment warranted thereby will be referred to simply as the *investment ratio* (i); whereas, with given techniques, the *acceleration coefficient* is a constant, the *investment ratio* is clearly variable. Both, however, are *ex ante* concepts reflecting the basic relationship between output and capital which the firm would like to achieve; the former, indeed, is a special case of the latter. In practice, the firm's efforts may be foiled, and the *ex post* quantities may diverge from the *ex ante* in the manner so well described by the Swedish economists. When statisticians discover some correlation between investment and changes in output, a little uncertain light may be thrown on i and even perhaps on α, but the danger of an appreciable divergence between the *ex post* and the *ex ante* quantities must always be kept in mind. (Fortunately it is sometimes possible to infer something about the importance of such a divergence by going behind the correlated series and making a detailed study of the economic conditions to which they refer.)

The significance of some of the qualifications mentioned above may vary not only from time to time but also from one type of capital to another. Here it must suffice to distinguish between three main types: work-in-progress, inventories, and fixed capital; corresponding to each of these will be a separate trio of ratios, v, α, and i. If output goes up, *work-in-progress* must also increase; this is perhaps the best example of Induced Investment as defined by Professor Hicks, and its importance will depend upon the length of the Gestation Period for the firm's output. Strictly speaking it is wrong to suppose that output can rise *before* investment has changed: investment must increase first, even if it only takes the form of more semi-finished goods on the factory floor. Professor Hicks has shown very clearly the implications of this fact for the model of the multiplier: the secondary increases in consumption must induce some further increases in investment. *Inventories* may also change with output, but the reaction is here much less predictable. If inventories were felt to be excessively

large before the expansion began, the firm may not attempt for a time to increase their volume and may not even try to make good immediately any depletion that may have occurred during the interval between the rise in sales and the rise in the deliveries of newly produced goods; a lower ratio of stocks to output may be welcomed, and the volume of demand will then have to rise substantially before an attempt is made to raise the volume of stocks in sympathy. Investment in stocks is undeniably more difficult to predict—although somewhat easier to measure—than investment in work-in-progress, because in the former case technology does not impose the same limits to changes in the coefficient linking investment to changes in output. Thus the investment ratio for stocks may diverge appreciably from the corresponding acceleration coefficient, but it is still plausible to say that *attempted* investment in stocks will tend to vary in the same *direction* as output. A further complication is implied, however, by the word *attempted*: a firm may try to carry more stocks with rising output, but it may have difficulty in doing so to the desired extent while sales remain a jump ahead of production. Its inventories may increase less than it would wish so long as the boom lasts, but may pile up for a time during the slump, when *ex ante* investment in stocks has declined. The consequence of this divergence between *ex ante* and *ex post* investment during the downswing will then be surplus stocks which will complicate the analysis of Induced Investment once recovery begins. An analogous difficulty arises in the case of investment in *fixed capital*, because time must elapse before it can be adjusted to changing conditions. If the plant needs to be expanded, the time-lag is determined by the Gestation Period for the capital goods in question; if it needs to be contracted, the lag depends upon the rate at which the plant wears out. Professor Hicks has laid some stress on this second lag in discussing the depression, but he does not seem to think that it will, as a rule, be so prolonged as to hamper the subsequent recovery with an incubus of excess capacity.[1] This is a matter of practical judgement, but in interpretating what facts we have we must bear in mind that we have so far neglected technical development in order to keep our analysis in line with Professor Hicks's treatment which classifies innovations as autonomous. If its progress to the scrap-heap is not hurried by obsolescence, capital will have to wear out physically and excess capacity is more likely to be a serious matter.

Enough has been said to indicate that i may diverge appreciably from α—apart from the possibility, not so far considered, that α itself may change in response to technical progress or variations in relative factor prices. At the same time it is very far from my intention to support the view, so strongly advanced by some economists, that the Acceleration

[1] Op. cit., p. 52.

Principle is more or less worthless and ought to be scrapped. For this principle draws attention to some important features of the cycle that are not always made so clear in theories which purport to dispense with it. Not only does it throw a strong light on the instability of derived demand, but it emphasizes the critical importance of the acceleration coefficient which depends, in turn, upon the capital coefficient and the Gestation Period. Perhaps it will help in assessing the Acceleration Principle if we consider the analogous case of the multiplier. The theory of the multiplier assumes a constant marginal propensity to consume, and it does not require any very prolonged reflection about the factors determining this propensity to appreciate that the assumption of constancy may be unrealistic; but, whether constant or not, it is a strategic factor during the cycle—and one which was largely overlooked before the mechanistic little model was evolved. Similarly, i may differ to some extent from α, but the latter is nevertheless one of the basic determinants of the magnitude of an expansion.[1] The more mechanistic versions of both the multiplier and the accelerator are somewhat unrealistic; both are special cases. But we must be careful not to be too clever and throw out the baby with the bath-water.

After this brief glance at a surprisingly prolonged and slightly bitter controversy, let us now turn again to the nature of the assumed change in expectations. In doing so we shall suppose that the firm's investment decisions are not in fact complicated by the presence of excess capacity,

[1] Professor Hicks has shown how big an effect a small variation in v can exercise. It is true that, instead of allowing v to vary within each cycle, he compares a number of cycles with different values for v in each case. But the moral is broadly the same (*Trade Cycle*, chapter ix).

In his review of Hicks's *Trade Cycle*, Kaldor writes: 'To rescue the accelerationist approach it would therefore have to be amended and qualified beyond recognition. . . . By the time these adjustments are made, the method becomes much too cumbrous and complicated to be workable, even for the purposes of an analytical toy' (*Economic Journal*, Dec. 1951, p. 840). Does Kaldor believe that the multiplier should also be abandoned? For it cannot be denied that the multiplier also becomes extraordinarily 'cumbrous and complicated' when the necessary amendments are made. The marginal propensity to consume may be affected in all kinds of ways over the cycle—by the recovery of a standard of life regarded as customary, by changes in consumers' cash balances and in the credit facilities open to them, by shifts in the distribution of income, by innovation resulting in the appearance of new consumers' goods, and so on. Moreover, a multiplier expansion takes time: with one new expansion just beginning, there will be many others at various stages of completion. Yet I should not myself be prepared to say that the theory of the multiplier is useless any more than the Acceleration Principle. Both can be regarded as valuable. (Cf. Goodwin's skilful treatment of the Accelerator in Hansen's *Business Cycles and National Income*.)

Nor is this all. If the mechanistic version of the Acceleration Principle is unrealistic, so is Kaldor's own model (*Economic Journal*, 1940) which takes too little account of innovations. One of the more amusing rules of model-making is that you may occasionally floor an opponent by resorting to a little realism. But it is implicitly understood that too much realism must not be used lest the critic destroy his own model as well.

The appeal to realism is a kind of atomic weapon that, by mutual consent, will only be used for tactical purposes. For who would survive a total atomic war?

either because capital bore the right relationship to output at the beginning of the expansion or because output has subsequently expanded sufficiently to absorb any excess. In this situation the firm will still be able to expand production a little, because, even when there is no *excess* capacity, there will usually be some *reserve* capacity;[1] but the possible expansion will be limited and user cost will rise. Whether the firm will then be prepared to increase its fixed capital will depend not only upon the magnitude of the increase in sales but also upon the length of time it is expected to continue. Professor Hicks makes this clear, but he introduces a somewhat extreme assumption about expectations. 'Now suppose', he writes, 'that there is an increase in output . . ., and that the increase is expected to be permanent—the new level is to be maintained indefinitely' (p. 39). This seems to be going too far. Firms may invest—indeed they usually do invest—with less confident expectations about the future. In this analysis of endogenous investment, the crucial question appears to be whether they expect the boom in sales to last long enough for the new equipment to pay for itself and to yield a satisfactory return. This is not merely a verbal modification, a minor gloss which can be accepted without seriously modifying the argument. It provides the analytical key to the distinction between Induced and Long-range Investment.

Long-range Investment

Long-range Investment is in some danger of becoming an unduly mysterious concept. Vague references to 'changes in population' or to 'the secular growth of the economy' are not very adequate and tend to suggest silent and impersonal forces operating with a steady relentlessness, neither hurried nor retarded by people's reactions to the excitements of today. More investment may indeed be justified by such secular developments as a rise in the population, but the gradual change in numbers must somehow make itself felt on the market-place and induce people to take action in a current situation. Nor is it always clear, when we speak of Long-range Investment, whether we really mean all changes in the capital stock which are warranted by secular developments. More bread is needed to feed a larger population, and this implies not only more bakeries but larger stocks of flour and more work-in-progress in the form of lumps of dough cooking in the ovens. Is all this investment 'long-range'? The answer would appear to be in the affirmative if what we have in mind is the nature of the ultimate causal factor. But this is not what Professor Hicks means by such investment: '. . . long-range investment . . . is only expected to pay for itself over a long period' (p. 59). There seems little

[1] Cf. P. W. S. Andrews, *Manufacturing Business*, chapter iii; J. R. Hicks, op. cit., p. 39; T. Wilson, 'The Inadequacy of the Theory of the Firm as a Branch of Welfare Economics', *Oxford Economic Papers*, Feb. 1952.

doubt that this is the most useful meaning to attach to the term. That is to say, we may include the bakeries, but not the stocks of flour, and certainly not the lumps of dough. But it must be clearly understood that the 'length of range' refers to the *life of the capital*: there would be (gross) investment of this kind even in an economy where secular change had ceased and aggregate demand was subject only to cyclical change.

Long-range Investment is often described as 'autonomous', and we must now consider whether this is justified. 'Our autonomous investment', says Professor Hicks, 'is only autonomous with respect to the multiplier and the accelerator' (p. 120). At first sight this may appear a satisfactory distinction, but on closer inspection one begins, I think, to have some doubts with regard to Long-range Investment—and also with regard to Innovations, although we are not for the moment concerned with the latter. Is it really true that cyclical changes in consumption—which is presumably what Professor Hicks means by the 'multiplier'—will have no effect on investment in the more durable capital goods? At all events such investment must surely be affected by the 'accelerator'. After all, it was precisely this kind of investment with which the traditional statements of the Acceleration Principle were concerned. Fortunately we may take it for granted that the trouble here is partly verbal. Presumably Professor Hicks is using the term 'accelerator' in a somewhat restricted sense appropriate to the requirements of his model in this context, and must not be accused of denying that—to take an obvious example—changes in the demand for housing will have an 'accelerated' effect on the building industry. The passage quoted above may, I think, be paraphrased by saying that 'autonomous investment is autonomous only with respect to the changes in output cumulatively engendered during the cycle'. This may help us to avoid a verbal misunderstanding, but the main question remains: Is Long-range Investment autonomous in this sense? An affirmative answer would make so much investment autonomous that the importance of the cumulative cyclical movements would appear to have been greatly exaggerated in all the literature. Buildings, whether domestic or industrial, must surely be termed Long-range Investment; and if public investment and investment induced by technical change are also autonomous, the residue attributable to cyclical expansion must be only a modest fraction of the total home investment. Of course it is conceded that Autonomous Investment will affect the course of the cycle, and that such investment may not itself proceed at a steady rate. Does this mean that in attempting to explain the amplitude of the cycle we are obliged after all to fall back upon the assumption that Autonomous Investment is conveniently bunched for reasons which are quite exogenous to the cycle itself? Before accepting so disturbing a conclusion it may be

well to ask whether all the investment in the autonomous category is really autonomous after all.

In the previous section the technically desirable capital stock was related to anticipated output without reference to the length of time the higher volume of output was expected to continue; this simplifying assumption must now be dropped. If the capital is at all durable, K must be related to a series of expected outputs over a number of years—O_1, O_2, O_3, . . ., O_n. The number of years depends upon the nature of the capital, and it is obvious that the length of range of different kinds of investment is a matter of degree. The first item, O_1, is an estimate of future output which will appear only after the elapse of two Gestation Periods—the period while the new capital is being made and the period while the first batch of goods is being produced with its assistance. This double lag may in some cases be a lengthy one and forecasts of O_1—let alone O_n—may be hedged with uncertainty; *actual* output in the period before the decision to invest is taken may be regarded as only a somewhat doubtful guide even to O_1. Our firm, we shall suppose, is selling more and is prepared to act on the assumption that the improvement will last for not more than 2 years after the increased output made possible by new investment begins to come on to the market. Investment of a kind likely to pay for itself in 2 years or less will then be induced by the rise in demand; that is to say, only O_1 and O_2 are relevant. The desirability of embarking upon investment in more durable capital will also be affected to some extent, but the effect may be small; if such capital was expected to pay for itself only over a period of, say, 20 years at the initial level of expected receipts, the rise in O_1 and O_2 may be so unimportant as to warrant our disregarding it. Some important qualifications must, however, be made at this point. To begin with, a change is actual sales may have a much greater effect on anticipations than would be the case if foresight were more perfect. If an improvement in the preceding period were assumed to be permanent, the distinction between long-run and short-run investment would be obliterated —provided attention were confined to changes in sales. The Inland Revenue assumes that factories have a life of 50 years, and although they may in fact pay for themselves in a shorter period, the length of time is likely to be considerably longer than the 4 or 5 years of a cyclical upswing; yet business men have been known to build factories in order to take advantage of a boom. Sometimes, no doubt, they have allowed their judgement to be unduly biased by current prosperity, and another aspect of business psychology may also be relevant—no enterprising business man who wants to build up goodwill likes to refuse orders even if prudence would dictate this course for a year or two. And in making his extensions, the entrepreneur may reflect that even if the boom collapses before he has recovered

his costs and earned a satisfactory return, good times will come back again. This last point is, I suspect, of sufficient importance to call for a fairly radical change in the treatment of Long-range Investment: instead of describing such investment as a somewhat mysterious activity carried on independently of the cycle, we shall, perhaps, do better to regard it as a form of capital outlay that is expected to pay for itself mainly in the good years of more than one cycle. The problem of planning for an uneven output stream raises many analytical complexities which have not, I think, been sufficiently investigated in economic theory; for the moment, however, enough has been said to indicate that even Long-range Investment may be influenced by a single cyclical rise in demand, although the influence may be considerably weaker than that exercised on investment in less durable capital.

The final qualification can be illustrated by taking an extreme example. If O_1 were zero there would be little point in embarking immediately upon a long-range project, even if at best O_1 could be only 5 per cent. or so of expected receipts over the life of the capital. Until the initial receipts are expected to provide some minimum rate of return on the cost of investment, nothing will be gained by making a start at all. Here, then, is a necessary condition for new Long-range Investment, though it is not a sufficient one. An improvement in short-run anticipations may not always have much effect on the estimated profitability of Long-range Investment, especially when allowance is made for margins of risk, but it may well affect the *timing* of such investment if the initial rate of return is now raised from a previously low level to the point where it is at least equal to the marginal cost of investable funds.

Investment induced by changes in prices and costs

In attempting to elaborate the concept of Induced Investment we have continued to use the term in a sense which implies that the inducement comes only from a rise in anticipated demand. But these changes in demand are not the only relevant feature of the cumulative cyclical movement: costs and prices will vary too, and such variations, together with the anticipations to which they give rise, may have a more powerful effect on *some* forms of investment than the accompanying changes in demand. What Professor Hicks describes as 'Induced Investment' could be better termed 'Investment induced by Cyclical Changes in Output'—or 'Investment induced by Cyclical Changes in Real Demand'. The use without qualification of the term 'induced' can lead to misunderstanding which the lengthier title may help to prevent. If our object is to understand the nature of the cumulative process, we must make allowances for other

cyclical inducements; unless this is done, too much will be pushed into a great hold-all labelled 'Autonomous Investment'.

Let us try to illustrate these remarks by turning again to Long-range Investment. The length of range is, as we have emphasized, a matter of degree, but in order to sharpen the analysis we shall suppose that we are dealing with projects of a kind which, on the receipts side, are predominantly autonomous. On the *costs* side, current developments may well be most important. One of the essential features of Long-range Investment is that the Gestation Period, though possibly lengthy as compared with the time required to complete other forms of investment, will be short relatively to the life of the capital. Thus, while short-run changes in demand may sometimes have only a minor influence on the estimated profitability of such investment, short-run changes in costs may be of great importance. For this reason the investment may be much less autonomous than would be supposed if changes in demand were the only cyclical inducements that needed to be taken into account. The modern habit of neglecting the importance of changes in costs can, I think, be explained by saying that the Keynesian Revolution has gone too far in correcting a bias in the earlier literature where too great stress was laid upon changes in costs to the neglect of changes in output; the Keynesians reversed the emphasis and some have even held that the Theory of Employment should be separated from the Theory of the Price Level. We are indebted to Professor Robertson for warning us that a separation of this kind may lead to error,[1] and the study of Long-range Investment affords an indication of how serious that error may be.

A good example of the effect of changes in costs on Long-range Investment is provided by the behaviour of the American building industry over the years 1919–23. Although there was a great shortage of houses after the war and monetary demand was running at a high level, comparatively little building was done before the collapse of the boom. The study of contemporary documents suggests that high costs were a strong deterrent and one which was by no means offset by high current demand because it was believed that the boom would shortly collapse—even, perhaps, before the Gestation Period for such investment had elapsed. It was during the slump that building activity began to increase with great rapidity; the powerful stimulus of low costs, coupled with the belief that the demand for buildings was strong and would remain so for some time, was more important than the deterrent of low current incomes.[2] In this way a most important constituent of total investment was first retarded and then stimulated by current cyclical developments, but the inducement came

[1] *Money*, 1948 edition, pp. 204–5.

[2] Cf. my *Fluctuations in Income and Employment*, chapters xi, xii, xvi, xviii.

from changes in current costs rather than from changes in current aggregate demand. During the depression of the thirties, the fall in costs did not stimulate the building industry to anything like the same extent; the offsetting weakness on the demand side was then too great and was only partially remedied by the rise in national income before World War II. Thus the cyclical inducements were less effective in the early thirties than they had been in the early twenties; in the latter period the resultant of opposing forces was such that building could be less ambiguously classified as autonomous.

Clearly it would be rash to try to describe the response of Long-range Investment to changes in costs over an allegedly typical cycle. Cycles are too individual for confident generalization, especially when the effect of the cyclical development under consideration depends so much upon more or less dubious anticipations. The most one can say is that low costs are likely to exercise some stimulating effect on Long-range Investment during a depression and that such investment may retain its importance till the latter stages of the recovery, when costs will tend to rise more steeply; thereafter one would expect it to fall off somewhat, although the decline may well be delayed because the Gestation Period will probably be fairly long and the rise in costs imperfectly foreseen.

Cyclically induced changes in capital intensity

Until recently it was customary, in analysing the inducement to invest, to distinguish between 'deepening' and 'widening', but it looks as though these categories are now being superseded by 'induced' and 'autonomous'. How are the two sets of terms related to one another? Professor Hansen seems to regard them as being virtually alternative labels for the same concepts. 'Autonomous investment has to do with changes in techniques which require more *capital per worker*. This I would define as a "deepening of capital". Induced investment has to do with providing the unemployed and new workers with capital of the prevailing types. This process may be called a "widening of capital".'[1]

I imagine that the authors of some earlier works on the trade cycle will be greatly surprised by this ruling. Changes in capital intensity, or 'the degree of roundaboutness', were certainly not regarded as autonomous by Professor Hayek! Nor can such changes be so regarded unless 'autonomous' is defined—most confusingly—in such a way as to apply to all investment except that which can be attributed to cyclical changes in demand. If less arbitrary definitions of 'autonomous' and 'induced' are

[1] *Business Cycles and National Income*, p. 190. It is scarcely necessary to add that Hansen's treatment of the factors determining investment over the historical periods he has studied has been very much more satisfactory than his definition, as quoted above, would lead one to expect. Cf. also Goodwin's treatment of widening and deepening in the same work.

preferred, these terms must not be regarded as synonymous, respectively, with 'deepening' and 'widening'. Investment induced by cyclical changes in demand is, admittedly, a form of widening, but it is not the whole of it; Long-range Investment, even if it were entirely autonomous, would often imply widening in the industry concerned. On the other hand, short-run cyclical developments may 'induce' changes in the depth of the capital structure; that is what the Austrian School had in mind.[1]

The earlier versions of the Austrian Theory were open to the criticism that widening was neglected. Professor Hayek sought to remedy this defect in his famous essay on the Ricardo Effect,[2] but he in turn was heavily criticized for other reasons. I do not want to reopen this controversy, in which I once took part,[3] and there is the less reason for doing so because it is now clear that there was some misunderstanding about the assumptions on which the argument was based. It was not denied by Professor Hayek's critics that if the supply schedule of investable funds were imperfectly elastic, or changed its position, it might be profitable to alter the ratio of capital to output. This admission is enough to allow us to say that changes in capital intensity may be induced by the cycle, but it may still be doubted whether such changes are likely to be of much quantitative importance. Admittedly the advance of technical knowledge may afford a strong inducement to make such changes, but we are not yet concerned with innovations, a topic dealt with in a later section. Technical knowledge is assumed to be given, and the only inducement to alter the degree of capital intensity is the movement of prices and costs. In attempting to assess the importance in such circumstances of changes in capital intensity we must, however, be clear whether we are dealing with a single firm or with the whole economy. To sharpen the issue let us suppose that for technical reasons, v is not merely the ideal relationship between capital and output but the only possible one, so that no change in capital intensity can be made by an individual concern. Sales are rising and are expected to rise for some time, but the funds needed for expansion are everywhere becoming more difficult to obtain. The expansion will then be retarded, but it will be retarded to a greater extent in the more capitalistic than in the less capitalistic lines of production.[4] Thus the

[1] A change in capital intensity will be taken to mean a change in the capital coefficient—the ratio of capital to output. It is sometimes defined as a change in the ratio of capital to labour, but the adoption of this alternative, although it would not affect the tenor of the argument, would make the analysis more untidy. The capital coefficient, and the related investment coefficient, have already been employed in analysing the effect of changes in cyclical demand, and it is more convenient to retain these ratios and define changes in capital intensity accordingly.

[2] *Profits, Interest and Investment*, chapter i.

[3] Wilson, *Review of Economic Studies*, June 1940; Hayek, *Economica*, May 1942; Kaldor, *Economica*, Sept. 1942.

[4] Cf. Hayek, *Economica*, May 1942.

composition of output will change in such a way that the ratio of total capital to total output tends to decline; the aggregate investment ratio may then fall, as Professor Hayek said it would, and its fall may weaken the stimulus derived from continued widening. It is true that in each firm capital intensity is unchanged, and only widening has taken place; but because, with the growing scarcity of funds, widening has been discouraged less in the less capitalistic lines of production, the ratio between aggregate output and aggregate investment may change. This is our first encounter with the problem of aggregation which, as we shall see at a later stage, has some ominous implications for stylized models of the trade cycle.

Technical progress

So far changes in techniques have been ignored, but it will presumably be agreed without further discussion that the factors already dealt with will also exercise an important influence on the readiness to adopt new methods of production. Innovations must not, therefore, be pushed uncompromisingly into the category of autonomous investment, for in part at least they are cyclically induced. As we have already seen, Long-range Investment is also partly induced, and the same is no doubt true in some degree of the other two forms of investment which will not be examined further in this article—Public Investment and Foreign Investment. Thus the sharp distinction between 'the induced' and 'the autonomous' has become so blurred that its usefulness may well be called in question. We cannot escape the fact that it will often be impossible to describe an act of investment as belonging exclusively, or even predominantly, to one category or the other. Thus, when a new plant is installed, it may replace older plant and will therefore be associated in some degree with maintaining capital intact: it may, at the same time, be larger than its predecessor because it is now profitable to adopt more capitalistic methods, or because widening seems justified by changes in demand; the investment may also be partly induced by changes in costs and anticipations about future changes; the new plant, moreover, is likely to embody the results of technical research, and the case for installing it will therefore have been strengthened by the progress of invention. A particular act of investment in fixed capital may thus be the outcome of complex forces and cannot, as a rule, be satisfactorily described by a single label: even the distinction between replacement and net additions cannot be traced with any ease and it is safer to talk about gross investment. Yet the labels do not for this reason lose their significance; the solution is to apply them, not to particular acts of investment, but to the *inducements* to invest. Professor Hicks's model appears much more realistic if the terms 'induced invest-

ment' and 'autonomous investment' are abandoned in favour of 'endogenous' and 'exogenous' inducements to invest. If I have not myself adopted the proposed procedure from the beginning of this article, this was because it seemed better to begin in the customary way by classifying investments rather than the inducements to invest, and to continue in this fashion up to the point where the case for making a change had become overwhelmingly strong.

The distinction between 'induced' and 'autonomous' must be applied to the motives for investing, but there are, of course, a number of other cross-classifications. Thus the classification into work-in-progress, inventories, and fixed capital refers to the function of the additional capital in the process of production. A further classification refers to the length of life of the capital, the example we have used being Long-range Investment. Yet another distinguishes between new capital necessary to increase production and that designed to raise the ratio of capital to output. It seems fair to say that some confusion has been caused by assuming, often implicitly, that the dividing lines of some of these classifications will more or less coincide: the identification of 'deepening' with 'autonomous' is a clear example. The classifications are, in fact, distinct, and it is dangerous to suppose that they can be coalesced.

Advances in technical knowledge, as distinct from their embodiment in what Schumpeter called 'innovations', may be regarded as largely autonomous inducements to invest, although some allowance should presumably be made for the extent to which research is stimulated or discouraged by cyclical developments. If *invention* proceeds at a steady rate, the attractiveness of investment will be continuously strengthened, but other factors, such as anticipated changes in demand, may be of sufficient importance to make the flow of *innovations* irregular. Not that there is in any case much reason for expecting this largely autonomous inducement—the invention of new techniques—to proceed at a steady rate; the rate may well be irregular. Moreover, when a major invention has been adopted, it may, as Professor Schumpeter has reminded us, have such far-reaching effects on receipts, costs, and anticipations throughout the economy as to warrant a whole series of complementary innovations. The importance of the introduction of the motor-car cannot be adequately gauged by considering the investment required to produce it; the building industry, for example, was also affected, and so was the propensity to consume. It is sometimes claimed that an increase in the capital stock will always reduce the rate of return—as though all capital were homogeneous and competitive; in fact, one kind of capital may well be complementary rather than competitive with another, and increased investment in one line will then raise the rate of return on investment in another. The

complementariness of certain kinds of investment is a basic feature of Schumpeter's theory of the cycle.

We must take account of such great innovations as the introduction of the motor-car if we want our theory to be really dynamic, but the effect of doing so is to weaken considerably any hope we may have entertained of finding enough unshaken parameters to make possible the construction of a plausible econometric model capable of explaining the fluctuations in aggregate investment or aggregate output.

Professor Hansen's suggestion that autonomous investment implies in the main the adoption of more capitalistic methods has already been criticized on the ground that changes in capital intensity may also be induced by cyclical changes in prices and costs: his statement must now be challenged from another angle because it is by no means obvious, on general grounds, that new methods will always, or even nearly always, be more capitalistic than those they supersede. It may be possible to contend that over the past two centuries technical advance has raised the ratio of capital to output, not merely the ratio of capital to labour; but, if our object is to understand the modern trade cycle, there is little point in this connexion in comparing a pre-industrial with an industrial society, and it may be more relevant to observe that some recent innovations have been capital-saving. The presumption that new methods will nearly always raise the ratio of capital to output (the capital coefficient) may be weak, but the presumption that they will have the immediate effect of raising the volume of gross investment seems to be a good deal stronger. For the initial outlay on the new methods, even if they are less capitalistic than the old, may be substantially greater than would otherwise have been spent over the same period on replacing the old.[1] The importance of this consideration may be appreciated by reflecting upon the probable effect on gross investment if capital were to be replaced only when it was physically worn out. We may, I think, safely assume that innovations tend to raise gross investment, and we may add in passing that excess capacity, on which so much stress is so often laid, will be a far less serious drag on expansion in a dynamic economy where plant may become technically obsolete before it is worn out.

The Structural Effect

In the literature on the trade cycle, innovations are too frequently described as though nothing more were involved than the introduction of new ways of making the same things. Yet it is a matter of common observation that the product is often changed as well as the method of production, and the new commodity may be radically different from any-

[1] Cf. my *Fluctuations in Income and Investment*, chapter vii.

thing that has gone before. To Professor Schumpeter innovation meant something more than scattered technical modifications in the making of old things: it meant this, it is true, but it meant even more the introduction of new things—railways, electricity, motor-cars, radio, plastics, synthetic fibres, and so on—with repercussions which spread throughout the whole economy. It is surely surprising that his teaching, supported as it is at this point by so much incontrovertible evidence, should have made so faint an impression on modern theory.

The importance of this aspect of innovation may be conceded, but it may be maintained that it is mainly relevant to the study of the trend; the cycle, it may be argued, is too short for significant changes in the composition of output to take place. I am not familiar with any evidence advanced in support of this view, and the few facts I once collected about the inter-war American economy point to the opposite conclusion[1]—which will be assumed in what follows to be the right one.

When the volume of output is changing at significantly different rates in different industries, it can be misleading to describe aggregate investment as a function of aggregate capital and the level of aggregate output: $I_{t+1} = Y_t f(Y_t/c_t)$.[2] For the inference may be drawn that with a given physical quantity of capital, the volume of investment will depend upon the level of output once full capacity has been reached. What matters is not only the level of total output, but the kind of goods of which this vast aggregate is composed and the suitability of existing capital for producing them.[3] Here, then, is another reason for qualifying to some extent the remarks so often made about excess capacity. Motor-cars cannot be manufactured satisfactorily in blacksmiths' shops! There may thus be a substantial amount of excess capacity in contracting industries throughout the whole of a strong boom, and the excess capacity which acts as a drag on expansion is only a part of the total amount of under-employed capital in the economy. After all, some idle capacity is the natural consequence of progress.

Enough has been said to indicate how easily the fallacy of composition may creep into our work, but in order to sharpen the issue let us once more concentrate attention on the inducement to invest created by cyclical changes in demand and ignore all other considerations. Suppose, then,

[1] Op. cit., Part II.

[2] The formula is taken from Kaldor's review-article in the *Economic Journal*, Dec. 1951.

[3] The formula above can, of course, be so interpreted as to allow for changes in the composition of output; with each item of capital measured by the discounted value of its anticipated output stream, the declining popularity of some commodities will tend to reduce the capital stock (c), measured in money, and the formula will then indicate that the profitability of investment has increased. This implies, however, reading a great deal into a somewhat cryptic formula in order to bring out a point neglected in the main by those who have favoured the formula.

that within each firm the acceleration principle is working smoothly: $I = v(dO/dt)$. Even in this highly simplified case, care must be exercised in moving from the firm's investment to aggregate business investment: there are likely to be wide variations in the capital coefficient between different branches of production, and if the income elasticities of demand are also markedly different, with the result that output expands more in some lines than in others, the *aggregate* capital coefficient, which relates total output to total investment, will be altered accordingly. That is to say, constancy in the acceleration coefficient within each firm does not necessarily imply constancy in the aggregate investment ratio. It may be objected that, in the special circumstances we have envisaged, the effect of varying rates of growth in different lines of production could scarcely be of much quantitative importance, but it is worth observing that the objection is stronger if investment is related, as it was in the older literature, to changes in the rate of growth of *consumption*; when the relationship is with total output, including the output of the capital goods themselves, then the importance of structural changes cannot be so readily dismissed. When the limiting assumptions are abandoned and allowance is made for the other inducements to invest, in particular the invention and development of new goods, these structural changes begin to assume sufficient importance to warrant their inclusion among the major factors determining the level of investment. The new goods may or may not require more capitalistic means of production than were employed before their production, but the impact of their introduction is likely to raise gross investment in the short run above what would otherwise have been spent on replacing old equipment.

Although it cannot be denied that the Acceleration Principle conveys an important truth, its application becomes increasingly tricky as we proceed from the particular to the general. Perhaps we should do well to get into the habit of thinking not of one acceleration coefficient, relating total output to total investment, but rather—as a more tenable approximation—of a series of such coefficients operating in each of the major industries. The task of summation will then present itself more clearly to our minds as a further complication of some importance which must be dealt with before the behaviour of total investment and total output can be adequately explained. Or, to make the point in a different way, the aggregate acceleration coefficient is the weighted average of the acceleration coefficients in each sector of the economy: not only are these component coefficients liable to vary themselves, but their respective weights in the national average will not be even approximately constant over the cycle. It was with this complication in mind that I confined attention earlier in the article to the cyclical behaviour of a single firm instead of

discussing total investment. On the analytical plane it seems wiser to stick to the firm in this way for a time at least, but when we turn to the empirical study of the cycle larger units must obviously be chosen, the choice depending largely upon statistical possibilities. Moreover, indivisibilities in investment may be smoothed out a little in the larger unit, although the law of large numbers can be applied only with caution when all firms in the unit are subjected to some common influences and bound by some common technical possibilities.

We need some label to attach to the complications caused by changes in the composition of output, and the most natural seems to be the *Structural Effect*. Whereas the various inducements to invest relate to the behaviour of the individual entrepreneur, the *Structural Effect* is concerned with the further complications that must be faced in moving from the particular to the general.[1]

These changes in the composition of output give rise to a further difficulty: the concept of 'total real output' begins to have a somewhat dubious appearance. From the outset we have recognized that it is anticipated changes in output which affect investment decisions, and the anticipations may not be based entirely upon the rate of change of output in the past. While the connexion between investment and actual output was therefore blurred by uncertainty about the elasticity of anticipations, actual output remained a clear enough concept because we were concerned with a single firm producing a given product. But the 'index-number problem' is encountered at once when we try to give some meaning to the idea of the aggregate real output of an economy where prices are changing and the composition of output is by no means constant. It may still be permissible, as well as convenient, to speak loosely at times of 'total real output', but we shall do well to remember that we are speaking very loosely indeed. It is not only the theorist who is handicapped by this difficulty but—to an even more serious extent—the applied economist who is trying to discover some relationship between indexes of total industrial production and other statistical series. For example, we must treat with great reserve any estimate of the connexion between investment and aggregate output per head, even if the calculation refers only to as

[1] The importance of the Structural Effect has been impressed upon my mind since the time when, after studying the models of the trade cycle which were then in vogue, I tried to investigate the fluctuations in the American economy between 1919 and 1937. The importance of the Structural Effect—not then so called—is emphasized in *Fluctuations in Income and Employment*, both in the theoretical chapter vii and in the empirical second part of the book. It is gratifying to see that Professor R. A. Gordon has now given the weight of his authority to the same conclusion in his essay on 'Cyclical Experience in the Interwar Period: The Investment Boom of the Twenties', *Conference on Business Cycles*, National Bureau of Economic Research, New York, 1951. Our mutual indebtedness to Schumpeter will be apparent.

short a period as that covered by a single trade cycle; it is just in those industries where the product is changing that investment is likely to be proceeding most actively with the result that the index-number problem is central to the whole discussion.

Savings induce investment

The reference in a preceding section to the growing scarcity of funds as the expansion proceeds may appear to be regrettably old-fashioned, but—unless this is held in itself to be a fatal objection—it may be worth while exploring the matter a little farther.

The simple theory of the multiplier, which forms the foundation of the more elaborate recent models, is itself based on the implicit assumption of a perfectly elastic supply of funds. The rise in investment, followed by successive rises in consumption, implies an increase in the amount of money or in its velocity of circulation, and the funds required must somehow be obtained without a rise in the marginal cost of obtaining them which might retard the expansion. Both the simple theory of the multiplier and the more involved accounts of the interaction of multiplier and accelerator may be regarded as preliminary attempts to study the nature of the stabilizing and disturbing factors in an economy where 'money doesn't matter'. Admittedly all such theories are monetary in the broader sense of that term, for all are concerned with fluctuations in aggregate monetary expenditure; but these fluctuations are attributed to changes in the real factors, not to variations in the supply of money itself.

In practice the supply of funds is not perfectly elastic: both bank charges and bond yields tend to rise, with a lag, during the upswing and to fall, with a lag, during the downswing. The monetary factor must therefore be brought into the model—as Professor Hicks, indeed, has done in the last two chapters of his book. This factor will be partly—perhaps largely—endogenous: cyclical developments will induce the banks to change their policy and thus afford a corresponding inducement, positive or negative, to invest; bond prices will be affected by changes in bank charges, though not in proportion, and they will also be affected by the changes in confidence engendered by the cycle. Opinions may differ as to the importance of these changes in interest rates, but it is not to this problem that I wish to draw attention, but rather to the effect of changes in the supply of risk capital.[1]

It is generally recognized that a firm's willingness to invest will depend in part at least upon the size of its own liquid resources available for the

[1] Cf. Kalecki, 'The Principle of Increasing Risk', *Economic Fluctuations*, chap. vii; F. W. C. Blom, *Oxford Economic Papers*, June 1951.

purpose.[1] Such reserves can be increased by issuing new shares, and it is a relevant fact, much overlooked in the theories of the cycle, that share prices, unlike bond prices, tend to rise till virtually the end of the upswing, a rise which reflects increased confidence as well as higher dividends with the result that share yield sometimes falls. But there are obvious disadvantages in going to the new issue market, and the crucial importance of the firm's own savings can scarcely be denied. Now it is sometimes held that effective demand is unstable because saving and investing are done by different people, but this is clearly an exaggeration: a large part of total savings is done by firms which save in order to invest. The extent of the exaggeration depends upon the length of time considered, for the act of saving and the act of buying new capital, even if done by the same agency, may not be synchronized. Over a period of, say, 6 months, the saving and the investing may be carried out very largely by different people, but if we consider as long a period as the upswing of a trade cycle, there will be a much closer correspondence between the two. In short, over the cycle, business saving induces business investment—and this has some untidy implications for the theory of the multiplier. In that theory, savings are deflationary, and it is only expenditure on consumption which can stimulate a further expansion of either consumption or investment. On balance it is no doubt true that the expansion will be stronger the larger the marginal propensity to consume, but it is not true that savings are wholly deflationary. Clearly much will depend upon the proportion of total savings made by business and to a lesser extent upon the proportion made by private persons who are wealthy enough to buy shares; much will also depend upon the cash position of business, which will be affected in turn by past saving and by recent expenditure on new capital.

It would be comforting to be able to believe that the importance of the complication we have introduced was small, or at all events unvarying between one cycle and another or between one phase of the upswing and another. But such comfort seems to be denied us. The inducement to invest afforded by new saving is likely to be small for some time if firms are as flush as they were in 1946. With firms as short of cash as they are in 1952, it is a different story: if some political miracle made it feasible to encourage a substantial increase in private expenditure today, it would be desirable not only to stimulate higher consumption by lower purchase tax but also higher investment by lower taxes on profits. And if we consider a

[1] If a firm has saved up in the past and invested part of its funds temporarily in bonds, the fall in bond prices may imply a capital loss if an attempt is now made to turn these reserves into cash in order to buy new capital goods—unless, of course, the redemption dates have been well chosen. The deterrent effect of falling bond prices may therefore be greater than would be supposed if attention were confined to the new borrowing by the issue of debentures.

cyclical upswing in more normal times, we may infer that the size of reserves may sometimes be a critical factor. If most firms have engaged in a substantial amount of investment in the recent past, their accumulated liquid savings may now be so small that they will want to pause and save up for a time before embarking upon new—and often indivisible—projects: the pause may be fatal if total investment declines.[1] Perhaps there was some sense after all in the old-fashioned suggestion that a shortage of savings could cause a collapse—though we must add that this could happen before full employment had been reached.

A nihilistic conclusion?

There seems to be no escape from the conclusion that, in attempting to analyse the major inducements to invest, we have thrown serious doubt on the adequacy of all the more stylized models of the trade cycle. I hope I shall not for this reason be accused of a failure to appreciate the usefulness of these models in their proper place, or of a foolish inclination to suggest that their creators are unaware of any of the difficulties discussed above. The models are fully justified by the light they throw on some aspects of the cycle, and the model-makers need not be blamed if they have deliberately left some other aspects in shadow—so long as they are frank about what they have done. The fact remains that all such constructions are incomplete in some serious respects, and for my own part I am inclined to doubt whether it is possible to construct a stylized model which will not be gravely misleading if it is described as 'the trade cycle'. This pessimistic conclusion may be falsified; I hope—admittedly with little confidence—that it will be. For it follows that we must be respectfully sceptical about the more grandiose econometric investigations which purport to explain the behaviour of such great aggregates as total investment and total output. If econometrics is to succeed it must be possible not only to discover some constant relationships over a period but also to show that their constancy is plausible and not merely accidental. To take an example, any steady relationship observed between changes in consumption and real income must be more or less accidental because the marginal pro-

[1] In some works on full employment published before the end of the war it was suggested that effective demand should be stimulated by the heavy taxation of profits and the granting of corresponding benefits to the less wealthy, because the propensity to consume would thus be increased: the effect on investment of a lower reward for risk-bearing and a lower volume of business savings was rarely taken into account. The authors of these works have not been so emphatic in urging the reversal of this policy in order to lessen the inflationary pressure—higher profits and less equality! Some economists, however, have held that a tax which reduces savings is not deflationary at all, and they too are guilty of some exaggeration. Admittedly a tax on profits is likely to be much less deflationary than a tax on consumption, but it will have some deflationary effect if firms are thereby deprived of some of the wherewithal for an expansion of investment.

pensity to consume is clearly influenced by other factors such as those marked cyclical changes in the distribution of income which it is now fashionable to ignore. And when we turn to investment, the importance of changes in the composition of output—which can be observed by direct statistical investigation—is such as to cast serious doubt on any econometrical analysis of investment which deals only with aggregates.

At first sight our conclusion may appear to be uncompromisingly nihilistic. If satisfactory mathematical models cannot be constructed and econometrical explanations of the whole cycle are probably foredoomed to failure, how then can we proceed? It is, in fact, quite possible to proceed and to obtain results of some practical importance. Our conclusion is destructive only of hopes which should never have been entertained. First we must repeat that the stylized models are most illuminating as far as they go, and the only danger is that we may become so fascinated by their ingenuity and elegance as to forget their limitations. Beyond a certain point, however, the further elaboration of a model ceases to be illuminating and ultimately becomes impossible; we must then adopt the less tidy method of identifying and analysing all the 'strategic factors' even if we cannot fit more than a few into any single mathematical model of the cycle. (The present article may be regarded as a somewhat rough-and-ready exercise in this method.) There is analytical work to be done here, but it would be wrong to try to draw a sharp line between the theoretical and the empirical: there is no such thing as a 'pure theory of the trade cycle', and there must be a constant movement backwards and forwards between factual research and analytical exploration. In the testing of hypotheses, the econometricians may perhaps be able to help a little if they will agree to lower their sights and investigate appropriate sectors of the economy rather than the level of total investment or total output, but I suspect that the main work must be done by the economic historian and by the economist, who, if his period is too recent to be called history without causing grave offence to other faculties, nevertheless approaches the subject in much the same direct and non-mathematical way as his more reputable colleague. No great precision need be hoped for, and at best there will be many loose ends, many unexplained developments, and much guess-work in the explanation of even one cycle in one country. There will certainly be too few parameters to tempt us to talk about 'the science of prediction'. But this amounts to no more than a recognition of the nature of the problem with which we have to deal. And, for all my scepticism, I suspect that the potentialities of the direct, as distinct from the econometrical approach, are commonly underestimated rather than exaggerated. It is not so difficult to draw some broad conclusions from the direct study of the facts provided that study

is buttressed by analysis. It would probably be true to say that more has already been achieved in this way than by the use of econometrics—and that at far less cost in time and labour. The strongest complaint one can make about both the stylized models and the econometrical experiments is that they are in danger of monopolizing the attention of professional economists and of diverting too much effort and ability from the more direct study of cyclical fluctuations.

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TRANSPORT POLICY BEFORE AND AFTER 1953

By GILBERT WALKER

I

RAILWAYS presented a fascinating and awkward problem to the accountants, economists, and statesmen of the nineteenth century. They were large organizations supplying an essential service for which at the time there was no substitute—if you wanted mechanical transport, and every trader and traveller did, you had to take the railway. But the cost of carrying any particular consignment or passenger is at best an indeterminate quantity. Costs of carriage can be held in one sense to include a proportionate share of the capital originally spent on the line and the annual maintenance and upkeep ever since, in addition to the actual costs of receiving, handling, moving, and forwarding the traffic. Cost in another sense might be interpreted as those direct costs alone; or no more than the expense to which the railway is put in accepting an extra passenger in a train which has empty seats and is ready to go, and an extra consignment of merchandise on a freight train already made up and about to be dispatched. The distinction between full average cost and bare prime cost is common to all industrial enterprise. Comparing the heavy and obvious investment in way, works, and structures with the negligible marginal cost of the extra passenger or extra consignment of merchandise, the difference between the two has in the case of railways always appeared unusually great. The way, too, was open to discrimination between customers on the widest possible scale. Transport by rail is sold as the carriage of a particular consignment of goods for a particular trader (or of a particular person) between particular points at a particular time. Had it not been for the intervention of the law (and the tendency to diminishing returns of ever finer distinctions) the railways might have multiplied discriminations to the limit represented by the number of combinations of traders (or travellers) desiring transport, consignments to be carried, stations on the systems, and times at which transport was demanded.

Railways, except for canals and coastwise shipping, had a monopoly of inland transport during the nineteenth century. But in Great Britain monopoly was enjoyed by no one company over the whole of its network. Some towns and most intermediate and country stations and sidings were reached by one company only; but most towns of consequence, before 1920, were served by more than one railway. Between these a particularly fierce and disruptive competition was the rule, broken only by intermittent and uneasy truce. The individual companies by this competition were

driven to cut rates against their rivals to any figure which offered a margin, however narrow, over the barest direct costs. The reduction of a rate below the average of all costs will only pay if that rate can be quoted to the trader able to threaten recourse to a competing service without running the risk of conceding a similar favour to others less fortunately placed. And by this same competition railways were driven to take the fullest possible advantage of the opportunities they enjoyed for discrimination against traders and travellers precluded by their situation or traffic from consigning by rival railway or water routes.

Argument in plenty was produced to show that discrimination assisted and did not injure those who thought themselves the victims of favours done to others. Railway expenditure incurred on joint account or in common for passengers and the several classes of freight traffic was claimed to be so high a proportion of the total that no figure could be ascertained which represented in any significant sense the cost of performing any particular act, or class of acts of transport smaller than the whole service provided by the railway. The best publicists of the day were hired to make the case, and in place of an indeterminable 'cost' the convenient alternative was found of 'value of the service' as a suitable and proper principle of railway rate-making. Inequities between man and man, and between one trader and another, for which there is no apparent (nor ascertainable) justification in cost conflict nevertheless with common ideas of justice, and a sense of outrage was lent when the recipients of the favours were large concerns and those against whom the discrimination was directed were small. Governments were soon driven to act. By the equality clause (section 90) in the Act of 1845, by the prohibition of undue preference in the Acts of 1854 and 1888, and, above all, by the obligation to publish all rates and keep the rate-books open for inspection, discrimination was finally confined within certain narrow and acceptable limits. There was discrimination between commodities according to the value of the merchandise and certain other characteristics; and between passengers according to the class of travel which they desired. But within the classification, as this instrument was called, all travellers and traders were assured by law of substantial equality of treatment regardless, in many important respects, of the actual costs of performing the service.

II

The charging-powers of railways, scattered originally through 900 Acts of Parliament, were brought together in the Board of Trade Classification of 1888 and in the thirty-five scales of maximum charges which were included in the Railway Rates and Charges (Order Confirmation) Acts of 1892 and 1894. By these orders and regulations, and by the interpretation

placed upon the law by the Railway and Canal Commission, Parliament all but deprived the railways of their commercial freedom and must have done a good deal to implant that business inertia from which railway managements have since suffered. The railway system was reorganized after the First World War. The Railways Act of 1921 formed the 120 or so separate companies into four amalgamated companies. Part III of the Act provided for a new classification; prescribed the principles on which merchandise should be classified; and authorized rates to be charged such that, given good and efficient management, each of the amalgamated companies would be enabled to earn a *standard net revenue*, a revenue based broadly on the net revenue actually earned in the year 1913. In view of subsequent events, it was perhaps unfortunate that the expectations of proprietors in the post-war years should have been raised by the offer of a standard revenue apparently equivalent to net earnings in the best year the railways had ever had!

The Act had listed, among the principles of classification, the value of the goods in relation to the weight. This principle was an inheritance from the nineteenth century. Classification by value was continued by the Act for good administrative reasons. It was familiar and had stood the test of time. No trader or body of traders had urged abandonment of classification and none had any new system to suggest.[1] The classification was revised by a Rates Advisory Committee, set up by the newly formed Ministry of Transport in 1919; and the task of adjudicating the schedules of standard and exceptional rates to be authorized under the Act was left to the Railway Rates Tribunal, a court constituted by the Act of 1921. The Tribunal sat to hear evidence and argument from railways, traders, and other interested bodies for 116 days between 1924 and 1927.

Counsel, leading for the railway companies in these proceedings, distinguished between *maximum* charges of the sort authorized by the Acts of 1892 and 1894 and the new *standard* charges. The old system had laid down the most which might be asked and left the railways to charge what rates they pleased less than the maximum, provided that the rate was published and that no undue preference was created. Under the new system the Railway Rates Tribunal was asked to determine the actual rate which should be charged. The distinction, as it turned out, was of no great economic significance. The Acts of 1892 and 1894 had been so interpreted by the Railway and Canal Commission that the raising of a rate had become a matter of extreme difficulty. The Railway and Canal Traffic Act, 1913, had specifically authorized general increases of cost as a matter justifying increases in a rate or rates. But until the passage of that Act

[1] Rates Advisory Committee: *Report of General Revision of Railway Rates and Charges*, 1920, Cmd. 1098, pp. 4 and 6.

a railway company seeking authority to charge a higher rate had to show that the cost of carrying the particular goods in question had increased since 31 December 1891 'to an extent sufficient to justify the increase in the rate, it not being sufficient to prove that an increase in their general expenses or a decline in their general revenue makes it incumbent on the company to make an increase on such rates as can best bear it'.[1] This could hardly be an easy task to an applicant committed to the proposition that the costs of any particular service cannot be accurately ascertained! Faced with so serious an obstacle in the way of raising a rate once lowered, even though still within the permitted maximum, no railway could have felt much incentive to experiment with charges, particularly at a time of rising prices, the general condition for the 30 years during which railway charges were governed by the Railway Rates and Charges (Order Confirmation) Acts of 1892 and 1894.

The new system imposed by the Act of 1921, rigid though it appeared from the clauses of the Act, allowed in fact a greater freedom. Railways, on giving notice to the Railway Rates Tribunal, were entitled to charge exceptional rates between 5 and 40 per cent. below standard. The criterion by which a rate was to be judged was its effect upon the ability of the railway to earn the standard net revenue, given good and efficient management. Satisfied on the latter score (though there is no evidence to show that the question was deeply gone into), the Railway Rates Tribunal had no cause to interfere with any exceptional rates put in by the railways as long as railway net revenue was less than the standard. Faced with depression, falling prices, and road competition, the railways after 1921 did not contemplate increase or withdrawal of exceptional rates as a means of adding to net revenue. At each of the annual reviews of rates and charges before the Railway Rates Tribunal the railways regularly reported that they had not earned their standard net revenue and as regularly refrained from asking for higher rates. It was not until trade had begun to revive and prices to rise again that the railways asked for and obtained, in October 1937, an increase of 5 per cent. in their rates and charges.

The Acts of 1892 and 1894 had allowed thirty-five schedules of maximum rates. Most of these authorized the same charge on the different lines to which schedules were applied; but there were some differences between the maxima which could be charged by the 120 or so operating companies of the old dispensation. These 'variations in the authorized maximum charges were to be found, not only when one railway was compared with another, but also as between one portion of a railway and another portion of the same railway, higher maxima being allowed in

[1] Cmd. 1098, 1920, p. 12.

respect of portions of a line specially costly to construct or specially expensive in operation, or to avoid making undue reductions in revenue. The variations are mainly observable in mineral and other heavy traffic comprised in Classes A and B. . . .' The maxima on railways to the south of London were for the most part higher than the maxima on the northern lines. The Cambrian Railway, the London & South Western, the L.B. & S.C.R., and the S.E. & C.R. were entitled to the highest maxima of 1·5*d.* per ton-mile in Class A for the first 20 miles and 0·60*d.* per ton-mile for all distances beyond 100 miles; the L.N.W.R., the G.N.R., and the G.W.R. shared the distinction of charging accordingly to the lowest maxima of 0·95*d.* and 0·40*d.* respectively.[1]

It had been thought desirable, if possible, to provide a uniform scale of charges for goods traffic throughout the country at large and do away with not merely the immense diversity, but to do away with any diversity, so that there should be one scale of charges for goods and minerals throughout the country; but it was found that that ideal was impracticable, and that having regard to the varying conditions obtaining on the different systems of the different companies it was not possible to achieve complete uniformity, and therefore you do find in the 35 Rates and Charges Order a certain amount of divergence in the maximum scales of charges for goods and minerals. . . .[2]

The Rates Advisory Committee, on the instructions of the Minister, had in 1920 asked traders the questions—Should a single scale of rates be fixed for all railways in England? Should the same scale apply to Scotland and Ireland as to England? To these questions the traders replied in the affirmative—that maximum rates should be fixed on a uniform basis and on continuous mileage as for one railway throughout.[3] In drawing up the new scales of standard charges the railways took the L.N.W.R. scale adjusted for wartime increases. The principle of continuous mileage was adopted, company frontiers were ignored, and a schedule of standard charges arrived at, to be uniformly applied over the whole country. The only variation occurred in the first four classes between the English scale and the scale applied to the N.E.R. and in Scotland. The latter was the higher, but the differences were accounted for by the fact that the N.E.R. and the Scottish railways had been accustomed to carry this traffic (mainly minerals) in companies' wagons. Elsewhere traders supplied their own trucks and paid a correspondingly lower rate.

III

One obvious result of the consideration given to value in preparing the classification of merchandise has been to raise the railway rate on the high-valued and high-classed merchandise and to lower the rate on low-valued

[1] Cmd. 1098, 1920, p. 11.
[2] Railway Counsel before the Railway Rates Tribunal, *Proceedings*, 45th day, p. 1327.
[3] Cmd. 1098, 1920, p. 13.

and low-classed goods. Road hauliers in the nineteen-twenties, unregulated and fiercely competitive both with each other and with the railway, had no alternative but to charge cost or less for their services. Classification by value consequently made a present to the competing road hauliers of any and all the high-classed traffic that they might care to bid for. The railways were left with the low-valued, low-classed merchandise on which railway rate was lower than road cost. High-classed high-rated merchandise was traditionally supposed to provide the higher margins over direct costs out of which were found the contribution to overheads and net revenue. Railways the world over during the nineteen-twenties and nineteen-thirties were calling the heavens to witness the injuries to which they were being subjected by wildcat, cut-throat, slaughter, and other picturesquely (and always pejoratively) described forms of competition. They complained that their road competitors were skimming the cream from the traffic; and they laboured for the most part under no sense of obligation to prove the case since orthodox opinion was content to accept the view that the costs of carrying any particular class of goods by railway could not be ascertained!

Preoccupation with the problem of classification and the question whether the presumed profits to be earned from the carriage of high-classed merchandise did or did not enable the railways to sustain the supposed burden of carrying low-valued merchandise at low rates obscured from attention the much more sinister consequences flowing from certain other characteristics of the schedule of standard charges. There is in the classification an allowance for the saving of cost which may result when merchandise is forwarded in large quantities;[1] but it has always been my impression that the concessions which were offered in favour of large consignments were not great enough and I have always thought, too, that the discrimination against the smaller consignments was insufficiently severe. But whatever may be the case between one class of merchandise and another, and between consignments of different sizes, it is quite clear that the cost of carrying the same class of goods will vary between wide limits indeed as between one route and another and between one pair of stations and another. With the one schedule of standard charges applicable throughout the country there is no possibility of a concession in favour of routes which, for one reason or another, are cheap to work per ton-mile of traffic conveyed nor of discrimination against routes which for other reasons are expensive. With the element in the rate for services at terminals varying only with the class of goods there can be no concession on traffic shipped through stations where handling costs are low nor discrimination against traffic shipped through stations where handling costs

[1] Railway Act, 1921, section 29 (2).

a ton are high. The existence of many millions of exceptional rates, each less than standard, may have had the incidental effect of introducing some discrimination of this sort, since railways on the whole have been the more ready to concede exceptional rates to traders offering heavy traffic than to those who can provide no such consideration; and volume of traffic is often a cause making for low costs per ton-mile. But nothing is known about the receipts per ton-mile on one route and another, and between one station and another; and there is no way of verifying how the proposition should be qualified that the railway rate per ton-mile at each distance and for each class of goods is substantially the same throughout the whole of the country.

The British Transport Commission have recently published a diagram which vividly illustrates the point at issue. On page 71 of their Report and Accounts for 1950 the B.T.C. compare the costs of carrying passengers per seat and per passenger-mile by main-line express, by main-line stopping train, by cross-country service, and by branch line. The costs of carriage per passenger-mile appear from this to vary from ½*d.* on the main line by express to 1*s.* 2*d.* by stopping-train and 2*s.* 1*d.* on the branch line! The passenger is charged throughout a standard fare (now) of 1¾*d.* a mile. A ride in a long-distance bus costs about ½*d.* a mile and the passenger is charged about a 1*d.* a mile for the return journey. Is it surprising that the buses thunder fully loaded down the Great North Road and Watling Street while there is always room on the expresses? The railway at 1¾*d.* a mile gets the custom only of those to whom time is of real value—and of those unfortunates who have not been able to get a seat on the bus or are burdened with heavy luggage!

The British Transport Commission has so far published no studies comparing the costs of one freight haul with another; but when they do we shall find, I am sure, the same pattern being repeated. The case of goods is much complicated by a classification which prescribes no less than twenty-one standard-class rates, by the many millions of exceptional rates, and by a charge a ton-mile which diminishes as the distance increases. But whatever the class of goods, and whatever the distance, the costs a ton-mile for trainloads shipped along the main line without stop between railheads will be low; the costs a ton-mile in broken trainloads to intermediate stations will be high, and costs a ton-mile in small and occasional consignments along branch lines higher still. Yet the schedule of standard and exceptional rates applies the same rate a ton-mile at the same distance when rendered in respect of the same class of goods. For each particular act of transport a rate is exacted by railway equal to the average cost of carrying all goods in that class and at that distance—with the consequence that railway rates are high relative to costs when costs are low, and low

relative to costs when costs are high. The road hauliers, and this is equally true of their successors, the British Road Services, charge a rate computed not as the average of all the business they do, but a charge estimated from the cost of carrying the particular class of goods to be forwarded to the destination desired, and at the time when and in the circumstances in which the goods are to be moved.

Is it once again to be wondered that the lorries crowd at night along the main roads between the big towns and the industrial centres loaded each way with less than 20 per cent. of their capacity empty while the railways get a load of 7 tons in a 10-ton truck (3·81 tons if coal and minerals are excluded), average 165 tons a train, and haul 9 empty wagons for every 23 which are loaded? The principle of arriving at the rate by averaging the costs might have served the interests of the public in a market in which, as contemplated by the Act of 1921, transport was monopolized by four amalgamated railway companies (or, after 1947, by one nationalized British Transport Commission). But it will not and it cannot work in a transport market in which the transporter, on whom is imposed the obligation of charging a rate computed from the average of all costs, is in any way exposed to competition from other transporters not so bound.

How the relationship of costs to rate stands as between high- and low-classed goods I do not know, and I hope that the Commission in due course will examine this question too. The railways have always considered that high profit went with high rates. But low-classed merchandise is also cheap to carry. Coal, minerals, and heavy merchandise move, it is true, at rates less than the average of all receipts per ton-mile and at rates which are less than road hauliers can afford (or could before the war). But these traffics move in full truck and often in train loads and require no handling. Traffic in these classes constitutes over two-thirds of the total ton-mileage hauled by rail and contributes one-half of the gross revenue from freight. I should not be at all surprised to find, contrary to received opinion among railwaymen and many others, that the cream lies at the bottom of the railways' bottle and not on the top![1]

IV

The Labour Government in 1945, inheriting in transport as in other fields what they fondly imagined to be the mess of centuries, applied without further thought their own peculiar nostrum. The properties of the four amalgamated companies were vested in a British Transport Commission together with all long-distance public carriers of goods by road. These were the general haulage firms holding an 'A' licence under the Road and

[1] See, on the matter of this section, Walker, *Economic Journal*, June 1933 (pp. 222–5); Walker, *Road and Rail*, chapters ii, iii, and iv; and the 'Notes on Traffic Costing' appended to chapter ii of the Commission's Report for 1951.

Rail Traffic Act, 1933, who carried only for others for hire and reward, and half of whose business was the conveyance of traffic for more than 40 miles. Private firms carrying only their own goods under 'C' licences were left free and so were certain specialized public carriers such as furniture removers. With these exceptions, the public haulage of goods by road for others by privately owned carriers was limited to distances within a radius of 25 miles from the carrier's home base.

The Commission were charged with the duty of providing an efficient, adequate, economical, and properly integrated system of public inland transport.[1] They were given the duty of making both ends meet taking one year with another (and including among their expenditure both interest upon and the redemption of that £1,300 millions of Treasury guaranteed stock which had been so prodigally issued in payment to railway proprietors and to the owners of road-haulage undertakings),[2] and they were given 2 years in which to draft a new charges scheme.

The reorganization of the properties vested in the Commission proceeded apace. A Railways Executive was set up and a separate region was established in Scotland.[3] Railwaymen from different companies had worked as a team throughout two world wars and had been accustomed during the depression to pooling arrangements and all manner of co-operative schemes. Men and organization were there, and the transfer of the railways could be made on 1 January 1948 with appropriate ceremony. But with the Road Transport Executive, as it then was, the case was quite different. When the Executive entered upon their duties there was nothing except office-space in the old Great Central Hotel at Marylebone. Everything had to be built and foundations had to be laid before the superstructure could be erected. A beginning was made in 1948 by the voluntary transfer under private arrangements of 400 or so of the largest haulage undertakings; and when the time came to get on with the compulsory acquisitions there was thus in being the framework into which could conveniently be fitted the businesses of the remaining 3,300 concerns marked for expropriation under the terms of the Act. The first acquisition notices were served in October 1948 and the first undertakings came into possession under the compulsory procedure in January 1949. One thousand eight hundred and eighty undertakings (including 45 owned by the railways and the 418 disposed of voluntarily) controlling 35,000 vehicles and 4,000 trailers were acquired by the end of 1949. Another 1,000 undertakings were acquired in 1950 and a further 900 in 1951, bringing the total up to 3,766. British Road Services, by the end of 1951, owned 41,265

[1] Transport Act, 1947, section 3 (1).

[2] See Walker and Condie, 'Compensation in Nationalised Industry', in *Problems of Nationalised Industry*, edited by W. A. Robson.

[3] Walker, 'Transport Act, 1947', *Economic Journal*, 1948.

lorries (excluding 5,000 which had been withdrawn from service and including 2,000 vehicles bought new), and its network of trunk services was virtually complete.[1]

This feat of organization is one on which Commission, Road Haulage Executive, and the many hauliers, both owners and salaried employees who entered the service of the Executive, are to be congratulated. The transition from private to public ownership was no doubt eased by terms of acquisition which, on the whole, were undoubtedly generous (even though in many cases payment still remains to be made!). But there were many difficulties, and among these the question of premises may be cited as an example. Few private hauliers have much need for premises and few boasted of much in the way of clerical staff and office. Road carriers before nationalization were small. Twenty vehicles were owned on the average by the 400 largest undertakings acquired voluntarily and an average of only 10 by the 3,300 undertakings condemned to compulsory acquisition. A yard in a back street, an open shed in which to do running repairs, and for duty as an office the front parlour or back kitchen of a neighbouring terrace house satisfied their simple needs. Business records could be kept in the owner's head with the assistance at most of a clerk to keep the books, and the routine required to run the 10 to 20 vehicles which made up the fleet of the ordinary haulier demanded little more office staff than a girl to type the letters and answer the phone when the owner was out. But a nationalized undertaking, organized in groups commanding 100, 200, and 300 vehicles, subject to a properly constituted hierarchy of district, division, and headquarters in London, needs ample space for offices and space is required, too, to accommodate the central maintenance garages, repair-shops, and the loading-banks on to which was collected traffic for particular destinations and from which traffic, delivered by an out-of-town group, could be distributed. An elaborate system of clearing was built up, interlinked by a teleprinter service—and nothing could be more out of place in the one-pair front than the clattering of a teleprinter relaying messages from group, district, and division! An embarrassingly large number of hauliers, it appeared, did not own but leased their premises under surprisingly short tenancies, and the lessors (who might, of course, have been the hauliers under another title) were often unable or unwilling to make over the premises on acquisition. British Road Services, when such an undertaking was to be taken over, might find that they had acquired nothing but the vehicles. Traffic was gone, drivers were gone, premises were gone, and the vehicles stood waiting in the street for want

[1] See 'Growth and Development of Road Haulage Executive'—a paper read before the Southern Section of the Institute of Transport on 8 October 1952 by G. W. Quick Smith, Secretary of the Road Haulage Executive.

of other accommodation! Stories have since been heard of B.R.S. lorries parked in vacant lots and traffic being transhipped in the street. The stories may well be true, and the reason is that shortage of space and the inadequate premises which B.R.S. inherited with the businesses they acquired.

The commercial and operating unit of the nationalized undertaking is the group. This usually consists of 100 to 300 vehicles and may control two or more depots. There are 200 groups and 1,000 depots. Groups are subordinate to districts, districts to divisions, and divisions to the Executive in London. The 30 districts and 8 divisions are territorial. The groups at first were also territorial, accepting all traffic in their areas and carrying to whatever destination it might be consigned. But this 'functional' organization led to much light and empty running, since neighbouring groups might at the same time be working lorries partly loaded to the same destination. Groups in the long-distance trade (except Pickfords', the parcels, and special-traffics group) are now organized in 'directions'. Each group is responsible for all traffic originating in the district and consigned to a certain town or list of towns. No other group in that district will carry to those towns, and it is the responsibility of all group managers in that district to pass on to the appropriate directional group traffic handed to them for directions they do not serve. It took some little time to carry out this change from functional to directional groups and some little time longer to persuade hauliers now become group managers to play the unaccustomed and uncongenial part of post-master for traffic which it was not their business to carry. Some, sticking to the letter of their instructions, disclaimed all responsibility for traffic not passing in the directions they served—much to the exasperation of traders who, quite naturally, expect any unit of a nationalized service to accept a liability for all the services which may be provided. But the directional groups were made aware of their responsibilities, and even if traffic cannot always be accepted by the nearest depot for delivery to the appropriate directional group, that group will be informed that a consignment is awaiting their attention. The improvement in the organization and consequently of the service offered by B.R.S. during 1952 was marked. A great part of the improvement is undoubtedly due to the fact that the former independent hauliers who serve as group managers are becoming increasingly diligent as bureaucrats in the discharge of their duties to the whole of the undertaking of which they are now only a part.

V

Organization, however well adapted to its purpose, cannot of itself secure that efficient, adequate, economical, and properly integrated system

of public inland transport which it was the general duty of the Commission to provide. One of the safeguards which traders had succeeded in persuading the Minister to include in the Act was the clause protecting the right of the trader freely to choose among the services provided by the Commission that one which suits him best. The Commission were able to lay down the principles which an integrated transport system should satisfy within 3 years of their entering upon their duties;[1] but so long as the traders' freedom of choice is protected by section 3 (2) of the Act, the Commission has not the power (nor, to do the present Commissioners justice, do they appear to have the inclination)[2] to direct traffic to that means, rail or road, by which it should be carried under a system integrated on their principles. If the Commission cannot direct, they must induce; and the only means of inducement at their disposal is the charging of rates which will attract traffic to those means which, in a properly integrated system, would be the more suitable and away from those means which are the less suitable. This question of rates and, above all, of the relationship which one rate bears to another is the hub of the problem of integration,[3] and it is with that problem, unhappily, that the Commission has been least successful.

The 2 years allowed by the Act for the drafting and submission of the draft charges schemes were up by August 1949. The Commission were allowed a stay and this has since been repeated. A London Transport and a passenger charges scheme appeared early this year and are now in operation; but the 5 years demanded by Mr. Barnes when moving the second reading of the Nationalization Bill in the House in 1946 had passed by the time the government were changed in 1951 and there was still no visible sign of the freight charges scheme. Certain principles of classification had appeared, and there was a rumour that, had all gone well, a classification and charges scheme might have been deposited with the Tribunal in August 1952. But a new and denationalizing government was then in power and the Commission could hardly be expected to press on with the drafting of a new charges scheme as long as the ownership of their road-haulage undertakings remained in doubt.

The Commission, too, were dogged by bad luck. With each turn of the inflation their costs went up and Ministers, overriding on occasion the authority of the Commission, were prepared to allow increases in wages which had been denied. Railway rates and charges under both the Act

[1] *Integration of Freight Services by Road and Rail: A Statement of Policy.* London: British Transport Commission, 1950.

[2] British Transport Commission Report 1951, para. 25.

[3] See, for example, the Chairman of the British Transport Commission before the Institute of Transport, 15 Nov. 1948 (*Journal of the Institute of Transport*, January 1949, particularly pp. 37, 39, and 40.

of 1921 and of 1947 are subject to a cumbrous statutory machinery. The Commission have performed nobly in the pursuit of economies; but the quarry has continually escaped them and rates have had to be put up in order to preserve the stability of the Commission's finances before the new charges schemes had been introduced. Much of the work already put into the drafting must have been lost, it can hardly be doubted, at each interim increase!

The Commission, if one may judge from the passenger charges scheme and from discussions in their annual reports, have considered it a proper part of the duty of a public undertaking to continue the obligation to provide transport at a cost which does not vary according to the many circumstances with which each particular transit is surrounded. In the drafting of their passenger charges scheme they applied the principle of the same charge for a mile of travel for everyone in similar circumstances, considering that the time had come for the nationalized transport services to make the same charge per mile for comparable kinds of journeys to everyone using a service regardless of where they joined or alighted.[1] Much was made of the obligations of a public carrier, and among these were included 'the obligation to apply uniformly an approved tariff which does not necessarily reflect the cost of the individual services required and usually makes no distinction between routes (or areas) with a small volume of traffic and those with a large volume' (Report, 1951, paras. 58, 59, and 60). While it was agreed that the true long-term costs should be sufficiently reflected in the charges made to the users (B.T.C., *The Fourth Year*, para. 29), the public system was held to be incapable of dealing with price competition which is casual, temporary, or experimental in character without entirely losing the quality of a public as distinct from a private transport service. 'There is in a sense', they said of passenger traffic in 1950, 'a social contract between all those who use the services to average out the cost over periods of time and flows of traffic.' 'That a public system should carry only when it likes or what it likes and should carry at prices which differ according to the season or route or user or to the particular circumstances of each "job"; which fluctuate with the state of the "markets" for each type of traffic; and which are governed only by the competitive requirements of the system and its own search for profit', remarked the Commission in 1951, 'will be something novel and unlikely to be tried' and indeed unthinkable, if one may judge at all from the language in which this paragraph is couched.[2] But how could a true public system exhibiting these characteristics meet competition from private carriers who are not so bound? The conclusion drawn by the Commission,

[1] *Report of Central Consultative Committee*, Cmd. 8513, paras. 8 and 9.
[2] Report 1950, para. 68; 1951, para. 84.

that the problem is one to which no solution has yet been found, should perhaps occasion no surprise, for the problem thus presented is, in fact, insoluble.

VI

The Conservative party, in their manifesto published before the general election of 1951, promised to free road transport. In the White Paper and in the first draft of the Bill issued respectively in April and July 1952 the pledge was to be redeemed by selling up piecemeal the lorries and business of the Road Haulage Executive. Any loss on the sale and any loss of revenue which might be suffered by the railways from the reopening of road transport to private competition was to be made good from a levy imposed on all operators of road transport, including the private trader carrying only his own goods in his own vehicles. Owing indeed to the preponderance of 'C' licences (private vehicles on 'C' licences have now risen to 800,000 compared with 170,000 lorries owned by British Road Services, the railways, and other public carriers), the private trader would in fact be providing the bulk of the funds raised by levy.

The Bill was badly received. Traders working their own vehicles (and this included the whole of the retail delivery section) were naturally indignant at the suggestion that they should be taxed to cover the losses expected to fall on the Treasury and on the railways from denationalization; and traders generally, while agreeing that funds to cover any capital loss from the sale of the R.H.E. must be found from somewhere, fiercely resented being asked to subsidize the Commission against loss of revenue consequent upon the exposure of their rail services to a more vigorous competition from the roads.

The first draft of the Bill got no farther than the first reading. Its further progress was allowed to be overtaken by the end of the session. Ministers expressed a willingness to listen to constructive criticism, and an understanding appears to have been reached during the recess according to which the Commission would not press for indemnification against loss of railway revenue if the traders in their turn would consent to the removal and relaxation of certain of the restrictions on railway charges. A second draft of the Bill was introduced and read a first time in November 1952. The new Bill continued with the proposal to denationalize by selling up the British Road Services. The levy was now confined to making good any loss on the sale. Railways were to be relieved from the equality clause of the Act of 1845,[1] from the prohibition of undue preference, and from the obligation to publish their charges. Traders against whom the railways still had a virtual monopoly by reason of the nature of their

[1] Continued as section 74 of the Act of 1947.

traffic were protected by the right of appeal to the Tribunal and so, curiously enough, were road hauliers who could show that a rate put in by the railways (or other services of the Commission) would result in loss to the Commission and was intended to eliminate competition. For the rest and within the framework of certain maximum rates approved by the Tribunal and published, the Commission were to be free to make charges by rail and other services at their discretion and without condition or limitation (section 18).

The Bill also provided for the dissolution of the Railways Executive and for the decentralization of the railways (except for finance and charges) upon a scheme of local organization to be prepared by the Commission. The 25-mile limit on (privately owned) public carriers imposed by the Act of 1947 is to be lifted on 1 January 1954 and not, as in the first draft of the Bill, at some date to be fixed by the Minister. Vehicles remaining in possession of the Commission (they are entitled to six-fifths of the fleets owned by railways in 1947) will require carriers' licences issued under authority of the Act of 1933. The provisions of that measure are to be somewhat relaxed. The interests of the public generally and of those persons requiring facilities for transport are to be given precedence over those of persons providing the facilities; the burden of proof in objecting to an application for a carrier's licence is now to be on the objector; and on an application, in considering whether existing facilities are 'suitable', the licensing authority is to be instructed to have regard not only to the adequacy, reliability, and efficiency of the existing facilities, but also to the charges made or to be made.[1]

Traders and associations of traders did not, in the main, object to the Bill as redrafted. A levy on road transport to make good the loss on sale was swallowed, with some natural reluctance, as the price of freedom. The release of railways from restriction was accepted on the ground that road competition was now a sufficient safeguard and also on the general ground of equity. The Association of British Chambers of Commerce, though the action was later disowned by two of the larger constituent chambers, alone broke the unanimity of opinion. While willing enough to see some relaxation of the law regulating railway charges, they were prepared neither to forgo the right of appeal to the Tribunal nor to accept the entire removal of the obligation to keep the rate-books open to inspection and accessible to the public. They objected to the inequity of levying the cost of a piece of public policy on a particular group, the users of road transport. They pointed out that sale piecemeal of British Road Services must disrupt once more long-distance haulage now recovering from the initial disruption caused by nationalization, and they feared that road

[1] Walker, 'Road Transport—Economics and the Law', *Modern Law Review*, 1939.

transport would inevitably remain a matter for political controversy. The A.B.C.C. proposed as an alternative that denationalization should take place gradually and by stages. Regional road-service companies should first be set up into which private capital might be attracted. Ultimately, no doubt, the Commission would be bought out, but until then there would be a joint financial interest. Private ownership would thus be restored without bringing British Road Services under the hammer and, by doing away with the danger of substantial loss, the need for a levy could be avoided.

VII

The long-distance carrier before nationalization did not usually, it now appears, own more than ten or twenty vehicles. If he owned fifty or sixty he would be distinctly larger than the average. Only one or two very special firms such as Pickford, Carter Paterson, Hays Wharf, and MacNamara were larger still. The small and separate firms had many advantages; but they enjoyed none of the economies of large scale. The road-transport business as a whole, for example, had been quite unable to develop any system for the clearing of traffic between one haulier and another and, except among parcels carriers, there was no means of forwarding and collecting traffic between connecting hauliers. If a trader in *A* had goods to consign to *B*, he had to deal direct with the haulier who ran between *A* and *B*; if he had goods for *C*, he had to find a haulier who ran to *C*; and if he wanted to send his goods on to *D* beyond *B* or *C* he had to fall back on the railway. There was no agency through which the trader in *A* could get his traffic to a haulier in *B* or *C* for furtherance to *D*.

One result of the nationalization of road haulage has been the imposition of organization on a large scale. Groups working large numbers of lorries gain in the cost of maintenance and repair and the R.H.E. claims to buy more cheaply. The British Road Services own upwards of 40,000 vehicles, and their groups and subordinate depots are linked together in a nation-wide clearing. Able to concentrate traffic on the appropriate directional groups and to assemble loads for the return journey (or to pass the lorry on to a depot making, normally or temporarily, more traffic than it receives), British Road Services are well situated to reduce the proportion of empty running. The greater technical efficiency and the comprehensive clearing which is accessible to transport operations mounted on so large a scale should be the means of reducing the costs of the large organization below the costs of the small. A group working between 100 and 300 vehicles and subordinate to a hierarchy of district and division undoubtedly loses something in promptness, punctuality, and in a service minutely specialized to meet the unique requirements of the individual trader. Whether the loss of commercial efficiency offsets the gain in

technical efficiency, and for what traffics it does or does not, are questions to which no one yet knows the answer. To sell up the R.H.E. now will undoubtedly cause some loss in technical efficiency since none of the new entrants are expected to be very large, nor indeed are they encouraged to be so by the limit of fifty which is placed on the number of vehicles which may normally be sold as a unit. But to find in the fact that combination and concentration into larger groups had made no significant headway before nationalization a reason for supposing the technical efficiency of the large in road haulage is always outweighed by the greater commercial efficiency of the small is to take too mechanical a view of business enterprise, particularly of that directed toward exploring the possibilities of large organization.

Large scale in itself is neither good nor bad. If one large publicly owned undertaking can provide as economically and efficiently as a number of small private concerns, then there is no good economic reason for preferring the one to the other. The menace of nationalization in road transport lies not in the size of the organization nor in the question of ownership, but in the element of exclusive monopoly, enjoyed by the B.R.S., of public long-distance carriage by road. That monopoly could readily have been destroyed by the simple means of lifting the 25-mile limit, and, had Conservatives really the courage of their convictions, by removing the requirement of an A, B (and C) licence imposed by the Act of 1933. Road transport would thus have been opened to private competition and the commercial efficiency of the small private undertaking would have been restored without losing whatever may be the technical efficiency of the large. British Road Services would have continued in being in competition with the new, and small, private entrants. Each party would get that traffic for which it could provide the better and cheaper facilities and the trader would have had the advantage of both, as indeed he should. If the technical advantages of large scale in road transport, supported by a nation-wide clearing-house, should in fact have turned out to be so little that there was nothing B.R.S. could do which the private firm could not do cheaper and better, then the issue of public ownership and the large in road transport versus private ownership and the small would have been finally disposed of by the bankruptcy of the former. Loss there would certainly be if this should have happened; but there is to be loss in any case from the sale of the R.H.E. and in addition threats of retaliation from the Opposition cannot be an encouragement to the investment of (private) capital and energy in the business of carrying goods by road.

VIII

Moving the second reading of the Transport Bill in November 1952, the Minister reminded the House of Commons that the prime purpose of

the Act of 1947 had been the integration of transport. He pointed out (obviously without much hope of acceptance by the other side) that the policy of integration had failed. There was, consequently, no longer any argument against returning the long-distance haulage trade to private ownership, since the only reason for nationalization in the first place was 'to provide an integrated service along with the Railways Executive'. Conservatives, he declared, in common with the majority of the people in the country, believed that competition gave a better service than monopoly. He proposed, therefore, not only to return road haulage to private ownership, but also to decentralize the administration of the railways and to remove some of the restrictions on their charging-powers. This, he claimed, was more in keeping with 'the new and tolerant view of majority opinion in Britain toward railway obligations'. He concluded by assuring the House that every reasonable suggestion for improvement would be looked at and that the obligations towards workers in the industry, both statutory and otherwise, would be scrupulously regarded.[1]

Members of the Opposition loudly bewailed the rude end that would now be put to the integration of transport. The eye of faith was able to discern in small matters the promise of great things to come. There was alarm, too, that the dissolution of the Railways Executive and the decentralization of railway management would seriously hinder, and might indeed stop, further progress towards the standardization of railway equipment and of practice. Labour members for the rest were chiefly concerned for the protection of those sections of the community whose interests they pretended to guard. Casting the road hauliers as villains in the piece, they feared for the lorry-drivers, now to be driven from the service of a public undertaking and cast upon their former and future employers. They feared for coastwise shipping and for the railways, exposed once more to competition from privately owned hauliers. They feared lest too successful a competition should adversely affect the wages and employment of railway workers. They feared for the consequences of 'an excess of overall transport facilities' and for what might happen if there should be a return to the 'chaos' of the nineteen-thirties. They feared for the vested interests of those who now enjoyed extravagantly cheap transport at the expense of the general body of users, and they wanted to know who would provide uneconomic services in a competitive transport market. They pointed out, rightly, that privately owned carriers could not be expected to do so, particularly if these were small; and they considered it 'nonsensical' to suggest that the user might pay the cost himself! Two members only, one Conservative and one Liberal, made any attempt to consider whether it might not be more economical for the public (and a competitive

[1] *Hansard*, vol. dvii, No. 10, col. 1405.

advantage to the railways) that railway rates should reflect those differences in cost which have recently been illustrated by the Commission. A former Minister of Transport expressed the conviction that too much of the country's capital, plant, equipment, and labour were invested in transport. No evidence was produced in support more substantial than the fact that (an alleged) 14 per cent. of the national capital resources were absorbed in transport and that 'apart from our civil and general engineering trades' transport is the largest user of labour.[1] The argument was not developed beyond the assertion that the country could no longer afford this state of affairs; but from this reasoning (if the sequence of ideas deserves to be so described) the House was presumably expected to draw the conclusion that the administrative integration intended by the Act of 1947 would have reduced the investment of resources in transport and so made for greater economy in the supply! Winding up for the Opposition, a former Parliamentary Secretary put this choice as 'the real question'—'are we to give the best transport service possible for a given expenditure of money or are we to say that the transport services are to be provided at the minimum cost to the provider of them? In other words, is the cost to the provider to determine what services are to be given or is the social cost to the community to determine it?' 'In the Transport Bill', he went on to say (he must have meant the Transport Act of 1947), 'the conception is that the social cost to the community—what the community can afford in the way of transport services—shall determine what shall be provided.' Relying on competition, Government had, of course, chosen the other criterion—of cost to the provider.[2]

The government got their majority. Subsequent discussion, in spite of the professed willingness of Ministers to consider amendments, was cut short by the guillotine. The Bill passed Committee and report without serious amendment and was sent up to the Lords. There can be difference of opinion about the selling up of the R.H.E., about the dissolution of the Railways Executive, and about the value (and effectiveness) of schemes for decentralization upon area (railway) authorities which 'reserve to the Commission general financial control and general control of charges'.[3] One may legitimately wonder, for example, how much commercial discretion can in fact be left to area railway authorities by a Commission responsible for fixing the rates and balancing the accounts. The Minister in Committee referred to the differences which had already arisen between the Commission and the Railways Executive. He went so far as to say that the Commission had already been considering the dissolution of the Railways Executive before his Bill was published.

[1] *Hansard*, vol. dvii, No. 11, col. 1608.
[2] Clause 14 (7).
[3] Col. 1701.

Interference is a fertile breeding-ground for differences between administrators; and those responsible for finance, in this case the Commission, when driven by pressure of deficits cannot help but interfere with those, until 1953 the Railways Executive, upon whom responsibility for management is devolved.[1] The Commission have been in this unfortunate position throughout the 4 years of their existence. The financial outlook cannot be improved by the removal from their control of long-distance haulage and by the exposure of their railways to private competition. The Commission will surely find it necessary in the future to continue as close a control over railway expenditure and revenue as they have done in the past. It is not easy to see how so detailed an oversight of the accounts can be compatible with that degree of local autonomy which alone can give any real scope to the initiative and enterprise of a decentralized management.

But all this is by the way. What is essential for policy is the fact that competition in transport has been deliberately chosen. Within the limits of the Acts of 1930, 1933, and 1953 the railways, the public road carrier and the privately owned are to be in open competition with each other and it is left to the trader and traveller to choose the means of transport which, at the rates quoted, best suits his purse and convenience. Whether the competition which road transport in the future will have to offer to the railways will be more or less severe than that offered at the present by the Road Haulage Executive and in the past by the private hauliers before them, is an open question. The answer depends upon many things, upon, of course, relative costs and among others, upon the state of trade and the manner in which the new instructions contained in the Bill are interpreted by licensing authorities when modifying the precedents which now govern the issue of carriers' licences. How much competition, on the other hand, the railways as a group (or groups) will be able to offer an internally competitive road haulage trade will depend both upon the use which the Commission makes of the right to charge railway rates at their discretion without condition or limitation and upon the extent to which the Commission can reduce the costs of their services both in particular and in gross. The Commission, one hears, had already let it be known that if the traders asked for competition they would get it. There need be no fears consequently on the first score; but the importance of the second can hardly be over-estimated. The Commission must be encouraged to invest capital in new facilities such as diesel engines and vacuum-braked trucks and in the railcars which are needed to make high-cost lines cheaper to

[1] The activities of British Road Services were no doubt another source of friction. Expecting to find in integration through common ownership relief from the pressure of uncoordinated road competition, railwaymen must have been distressed to see the Road Haulage Executive, under authority of the Commission, bend their energies to the task of building up a nation-wide network of (competing) trunk-road services!

operate and more efficient; they must be allowed to withdraw services and facilities which even so cannot be made to return at least some contribution to central charges. If the Commission cannot secure these advantages, then they will find themselves continuing in a position in which working expenditures are inflated by costly services and by the cost of keeping in service facilities which do not pay.

'By a public service', the Commission had remarked in 1951, 'is meant a service which normally accepts the obligation to carry virtually all classes of goods for all persons at all times.' 'Other obligations normally implied by public service include', they went on to remark:

> (*a*) the obligation to operate services regularly even though this is not financially profitable in certain cases;
> (*b*) the obligation to give all users equal treatment under similar conditions; and
> (*c*) the obligation (already referred to above) to apply uniformly an approved tariff which does not necessarily reflect the cost of the individual services rendered. . . . These obligations are *logical* consequences of the primary obligation to carry for it would be useless to impose the obligation to carry *if the carrier could nullify the obligation by charging exorbitant or fluctuating rates or by suddenly stopping the regular operation of one or more of his services* [my italics].[1]

The Commission had observed earlier that

> there could be 'no question of withdrawing from customers the services they required and for which they are prepared to pay a reasonable price. . . . All the Commission ask is that the customer shall pay the real cost of the service he selects and that he shall not receive one service at its bare cost if he insists at the same time on the maintenance of other services at less than cost.[2]

That is reasonable enough; but no large carrier in a competitive market can accept without subsidy an obligation which contains any part of the implications conveyed by the words italicized, except at the cost of endangering the stability of the finances; and no small carrier could support any part of it. An obligation to carry at a rate which in any respect or in any circumstances leaves any significant element of cost uncovered is proper only to monopoly or to carriers, such as the railways were expected to be after 1921, who can be regulated as such, because they were at liberty (or were required by law) to average costs over all their services and to use surpluses earned on one traffic to offset deficits incurred in carrying another.[3] Monopoly has now gone, if indeed it ever were with us. Competition is to take its place; and in a competitive market no carrier can average his costs and hope to fall back on internal subsidies as the means of balancing his accounts. In a competitive market it is always open to any competitor to undercut the average when it is to his advantage to do so; and the carrier assuming an obligation to charge the average

[1] Report 1951, paras. 59 and 60.
[2] Para. 25.
[3] Report 1951, para. 27.

either voluntarily or because he is required to do so, stands in danger of keeping the traffics which cost more than the average to convey and losing all those which cost less—exactly the situation in which the railways have found themselves since 1921.

The Act of 1947 set the Commission free from the obligation to charge the standard and exceptional rates prescribed by the Act of 1921.[1] The new Bill sets neither condition nor limitation on the rates they may charge and frees them from the explicit requirements of the equality clause in the Act of 1845, from the prohibition of undue preference contained in the Acts of 1854 and 1888, and from the liability to publish their rates and charges.[2] These relaxations, in fact, relieve the Commission from the really burdensome parts of the obligations of a public carrier as these have been understood in the past and accepted by the Commission. Some averaging of cost between one of the Commission's services and another will doubtless remain if only for the very good reason that so large an undertaking will find that it does not pay to cost separately each traveller and each trader's traffic. For this and other reasons the question of the terms on which transport can be provided in a competitive market are clearly more intricate for the large carrier than for the small, for the railways than for the road haulier, because the problems of costing are more involved and because the fundamental question, what does and what does not pay, may neither be so easy to interpret nor to answer. But the principle which, in a competitive market, must govern transport charges is simply this: that neither the Commission nor any competing carrier must be put, deliberately or inadvertently, in the position of being burdened with a service or an obligation at a rate or on terms which demonstrably do not cover the costs of providing the service for which the rate is being charged or the terms arranged.

This principle carries with it the obvious corollary that no carrier can continue to be subjected to an obligation from which, if it should clearly constitute such a burden, he cannot escape either by raising his price or by withdrawing the facility. Some of the implications and possibly some of the more startling consequences of the thoroughgoing application of this principle can be forecast by those who reflect upon the comparison of rail and bus costs per passenger-mile illustrated in the diagram already quoted on p. 71 of the Commission's report for 1950 and upon the hints dropped in the notes on traffic costing appended to chapter 2 of the Report for 1951. The public, it is clear, will have to accustom themselves to far-reaching changes if competition between road and rail is to govern the services to be provided and the rates to be asked! Passenger fares per mile, it appears from this evidence, may go up by many times the present

[1] Section 77.

[2] Sections 18 and 19.

average of 1¾*d.* a mile on branch lines and by stopping-trains if the passenger on the main-line express is to have the advantage in the fare of the very low cost, of ½*d.* a mile, at which he can be carried. And have this advantage he must in a competitive market if services, in the cant phrase, are to be 'co-ordinated' by the railway winning back from the long-distance coaches that main-line express passenger traffic which is carried certainly more quickly and comfortably by rail and, it also appears, more cheaply than by the long-distance coaches. But travellers to intermediate stations and to points on branch lines charged (for those parts of their journeys) at a shilling or two a passenger-mile will never take the train, nor should they if, as it seems, the buses can do these journeys for a fare very much nearer a penny a passenger-mile. Services by rail in these parts should be withdrawn and the passengers left to make their way by bus, as they probably do now in any case. Adequate facilities for passengers' luggage and small-parcels traffic could fairly be imposed as a condition on all country bus licences. But when all is done that can be done by private and public enterprise within a framework of competition, there will no doubt, finally, remain places so inconveniently located and areas providing so little traffic—the western Highlands and central Wales occur at once to mind—that no service by bus or rail can cover the costs at any fare the ordinary traveller can afford to pay. To that sort of problem an outright public subsidy is the only solution if anything cheaper than a taxi or hired car is thought to be necessary. A subsidy is in fact being given now, but it is concealed in the Commission's (railway) accounts and is paid in part by passengers by main-line express in England. Traditional practice apart, this distribution of bounties and taxes is more appropriate to fiscal policy than to the duty of transport undertakings.

The Commission have found that 'in present circumstances, the cost of rail transport (of freight) is likely to be lower than the cost of road transport and vice versa, according to conditions as follows:

(Cheaper by) *Rail*	(by) *Road*
Direct route	Cross country route
Heavy flows	Light flows
Long distance	Short distance
Direct rail access (sidings)	No easy access to rail
Mechanised handling	Personal handling
Heavy bulk (train load)	Smaller bulk
Robust commodities	Fragile commodities.'

In addition, 'there are of course fluctuations of cost from area to area according to the geography of each area and the admixture of traffics in each'.[1]

[1] Report 1951, 'Notes on traffic costing', paras. 25 and 26.

While it is no doubt true that the costs of handling traffics comprehended under the headings of the left-hand column are lower by rail, it is also true that these classes of traffic, being those which are cheap to convey, can also be handled by road at lower cost than the traffics included in the right-hand column. Given competition and a railway bound by the General Classification of Merchandise, the Schedule of Standard Charges, and all the other provisions of the law, the road hauliers naturally and as a general rule competed most vigorously for the traffics cheap to convey in the left-hand column and left to the railways the burden of carrying the more costly traffics found in the right-hand column. Railways, under a 'co-ordinated', 'integrated', or merely economical and efficient system of transport, should concentrate their energies on carrying those traffics for which rail transport is most suited and therefore least costly. Now that railways are freed from legal restriction and in a competitive market (or for that matter in any market in which the trader remains at liberty to choose between several services), their claim to the traffics in the left-hand column can be established by reducing the railway rates for these traffics below the road cost. This policy, if pursued with sufficient vigour (and that is what is implied in competition), will drive the road hauliers away from main traffic routes (except for those special traffics for which road haulage has a distinct advantage in service or in some particular element in costs), away from the heavy flows and the long distances, away in fact from their present field of operations. Competing road hauliers who cannot offer a specialized service will have to migrate, if they are to keep their capacity occupied, to the fields represented by the classes of traffics included in the right-hand column and concentrate their energies (if the verb can be used to describe so dispersed an activity!) on the cross-country jobs, on the short distances, the smaller loads, and the inaccessible destinations. But their costs and consequently their rates for these classes of business will be higher naturally than costs and charges per ton-mile at present, since hauliers now select the traffics in the left-hand column which are the least costly to convey. Though less than rail cost according to the Commission's reckoning, road costs and road charges for the traffics in the right-hand column, which by any means are expensive to convey, will almost certainly be higher than the present railway rates, since these are based on the average of the traffics in both columns combined. The Commission, following the rule of cost, will no doubt raise railway rates on traffics in the right-hand column as they have reduced the rates on traffics in the left-hand column. This attempt must be accepted and should indeed be encouraged. But if railway rates for these classes of traffics should be raised above the road charge (and this surely will be the case since rail cost is apparently the higher!), then the traffic will

presumably go by road in preference to rail. The Commission, able to show a dwindling patronage from the stations and over the lines affected, will be in a strong position to claim relief from a service now become an obvious and unnecessary burden by withdrawing the facility. The resulting economy will help to reduce the costs of their undertakings generally and thus permit of lower charges for those favoured traders who ship the traffics in the left-hand column; but it may also deprive of their rail facilities any areas in the country in which the traffic falls predominantly under the headings of the right-hand column!

Traders, in these new circumstances, who ship between the big towns, deal in train-loads, and are in a position to adapt their consignments for mechanical handling, will enjoy all the advantages of competition. They get the lowest railway rates and have access, if they need them, to those hauliers whose specialized services are a source of competitive advantage in an area otherwise dominated by low railway costs. Traders shipping cross-country, whose traffic is not easily handled and who have no private sidings, may find that the cost of transport, by both road and rail, has gone up even though both services are available. The trader who consigns merchandise regularly to a destination not readily reached from a railhead will no doubt be able to make an arrangement (at a price which covers the cost of the particular services he requires!) with a local road carrier; but he who ships only an occasional parcel may have to rely on the country bus or, more likely, leave the consignees to collect the merchandise from the nearest convenient point served by the railway or other regular transport service.

These are differences from present practice sufficiently well marked; but there are other possibilities which should be noted. Railway rates today are fixed in advance, subject to the approval of a Tribunal, published and posted in a rate-book which all may inspect. Under the new dispensation the Commission will be free if they choose to give each of their station agents, not a public rate-book, but in strict confidence a list of the least costs at which the railway can afford to carry the classes of traffic accepted at that station to the destinations which the railway is prepared to serve. Agents could then be urged to canvass for all the business they can get at any rate above these costs. Each rate would be the subject of a separate (and private) negotiation, and by way of encouragement, the agent might be paid a bonus depending upon the amount of traffic brought in and the excess of the actual rate over that unadvertised least cost.

The Commission, having closed branch lines and any stations which do not pay, can doubtless be expected to apply to the Tribunal under the terms of section 18 for maximum rates which, in the circumstances least

favourable to the carrier, adequately cover the costs of carriage to all those stations and sidings which remain open.[1] The statutory obligation to carry is an obligation limited by the terms of the statutes by which it is imposed and these clearly now include the Act of 1953. That obligation is discharged if the Commission, as they presumably will, stand ready to carry to stations and sidings to which a service is still maintained at a rate which, in the absence of any agreement to the contrary, is the maximum fixed by the Tribunal. An obligation to carry on these conditions ceases to be a burden, since costs are adequately covered and ample room is left within the maxima for the negotiation of private and unpublished arrangements with traders in a position to offer valuable consideration in return!

Whether a large concern such as the Commission can in fact devolve so much on to its local agents and whether indeed such devolution will in fact be consistent with that control over finance and charges which the Act reserves for the Commission is another question, and one to which experience alone will give the answer. But certain it is that the greater the degree of centralization of charging, the less effective the Commission in competition. No large concern can compete effectively with a small rival when success depends upon marginal differences in relative prices, if the offers and counter-offers of the large have always to be referred to a central body. This constant reference to head office in London hindered the railways in competition before the war far more than the formal requirement of consent by the Railway Rates Tribunal. The small haulier could then, and no doubt will in future, be able to give a quotation at once without waiting to hear from higher up.[2]

The obligation to publish has been limited, in the past, to the insertion of the rate in the rate-book at the station from which it was charged. The search for a competitor's rate was laborious, for no index was kept and might not be successful since there was no guarantee that, when other business was pressing, the rate-book was kept punctually posted. Relief from the obligation to publish is nevertheless only reasonable. As the present writer has argued elsewhere, it was above all things that facility which, by enabling one trader to find out what any other trader was paying, did so much to enforce a substantial equality of charges beyond the

[1] The author has suggested earlier that the case might be met by superimposing on a classification of merchandise according to loadability or other appropriate principle, a classification of stations according to costs of handling, and a classification of routes according to traffic density and operating characteristics. The result would be a system of rates closely approximate to costs which could serve as a basis for the published scales of maximum charges. See Walker, 'The Economics of British Transport', *Westminster Bank Review* for August 1950, and 'Some Thoughts on the Integration of Transport', in *Modern Transport*, Dec. 1950.

[2] Walker, *Road and Rail*, chapter viii, 'The Penalty of Bigness'.

limits demanded by the law and again disabled railways in competition with the road hauliers.[1]

Passenger fares and services may be ascertained by travellers and anybody can masquerade as such. The railways up to the present have always been ready to provide information about freight rates from goodwill and possibly also because the inquirer could always demand the right to look for himself. Hauliers and traders rarely made any secret of the road charges. Once convinced that individual names would be withheld, the numbers of instances which the diligent inquirer could collect made it virtually impossible to isolate the source of any particular rate. But in each area there is only one railway. It will be obvious by whom any railway rate is being charged. Freed from the obligation to publish, neither trader nor Commission can be expected to give away such a trade secret lest it fall into the hands of a competitor not so favoured.

The prospects, it must be admitted, of ascertaining the detail of the charges and the facilities which have, in fact, been established by road and rail for the several services in the competitive market of the future are not promising. And if these facts cannot be ascertained, how can we detect, and still less measure, the results of the revolutionary changes in practice which it appears should be the consequence of the Transport Act of 1953?

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[1] Walker, *Economic Journal*, 1933, pp. 223 and 224; Walker, *Road and Rail*, chapter vi.

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